



Traffic Management Manual for Work on Roadways (TMM)

2020 Office Edition



Ministry of
Transportation
and Infrastructure

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Foreword

The 2020 Traffic Management Manual for Work on Roadways (TMM) is an update to the 2015 Interim Traffic Management Manual for Work on Roadways and accounts for edits, comments, and feedback received during the four-year phase in period.

Winter maintenance activities are not specifically covered in the TMM. BC Ministry of Transportation and Infrastructure's winter maintenance activities are defined in their Highway Maintenance Agreement and/or other written policies.

This Manual was developed through the effort and support of many individuals and organizations that provided technical expertise, drew on past experience, and applied innovation to new devices and methods of traffic control.

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Ministry Publications	
The Traffic Management Manual for Work on Roadways was built upon a compendium of the previous Ministry Work Zone Manuals and related Ministry Technical Circulars	
Other Publications	
Geometric Design Guide for Canadian Roads, 1999	Transportation Association of Canada
Manual of Uniform Traffic Control Devices, 2009	US Federal Highway Administration
Manual on Uniform Traffic Control Devices, 2012	Minnesota Department of Transportation
Temporary Traffic Control Manual, 2011	Minnesota Department of Transportation
Temporary Workplace Traffic Control Manual, 2010	Nova Scotia Transportation and Infrastructure Renewal
Work Zone Traffic Control Guidelines, 2012	Washington State Department of Transportation
Ontario Traffic Manual – Book 7 Temporary Conditions, 2014	Ministry of Transportation Ontario

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³ Part B is mandatory for Ministry projects and recommended for municipal projects

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Section 1: Introduction

1.1 Traffic Management Manual for Work on Roadways

Traffic Management	The strategies designed to safely mitigate the impact of construction, rehabilitation, maintenance, incident management and special events on roadways to maintain mobility and worker safety. The documentation of strategies is completed using a Traffic Management Plan.
Traffic Control	The effective use of temporary traffic control devices to protect workers and move road users safely through a work zone. Traffic Control is implemented using a Traffic Management Plan

The Traffic Management Manual for Work on Roadways (TMM or the Manual)—including the updates that may be issued from time to time—is required for planning and implementing traffic control for work zones on Provincial highways.

The Manual updates and combines information from these previous Ministry publications:

- 2015 Interim Traffic Management Manual for Work on Roadways
- Traffic Management Guidelines for Work on Roadways, 2001
- Traffic Control Manual for Work on Roadways, 1999
- Technical Circulars relevant to temporary traffic control (up to publication date)

1.1.1 Purpose of the Manual

This Manual outlines fundamental principles and guidelines for traffic management and traffic control in work zones with the goal of ensuring the protection of workers and the safe and efficient movement of road users through the work zone.

It also includes standards for designing, applying, positioning, installing, maintaining, and inspecting various types of temporary traffic control devices through work zones, including signs, channelizing devices, signals, barricades, markings, lighting, and others.

1.1.2 Minimum Standards in the Manual

The standards in this Manual are mandatory for Provincial roadways.

Minimum standards are prescribed in the Manual for controlling traffic through highway work zones. Several typical situations are illustrated to show the recommended application of standard devices for planned, scheduled work on roadways.

All projects involving highway or street construction or maintenance, utility work, and incident management shall control road users—drivers, pedestrians, cyclists, and those with disabilities—and provide them with the information and guidance they need to successfully traverse the work zone.

Complying with minimum standards is mandatory for all works on Provincial roadways, including but not limited to, work performed by contractors, sub-contractors, and public utilities.

The standards are designed to minimize impacts on existing traffic, and maintain vehicle, pedestrian, cyclist, and worker safety during road projects. They apply to all sizes of roadway projects.

If minimum standards cannot be met—for whatever reason—the contractor shall discuss the matter with the Road Authority to develop a suitable resolution. It is understood that it may not be possible to meet these minimum standards in emergency situations.

For Ministry Roadways, Ministry Maintenance Contractors may be exempt from standards in this Manual, as defined in their Highway Maintenance Agreement.

1.1.3 Applying the Principles in the Manual

1. The term “work zone” in the Manual (see also [Appendix A: Glossary](#)) refers to the area which extends from the first traffic control device to the last traffic control device as seen by the travelling public, installed specific to the work.
2. The Manual provides guiding principles for traffic management and traffic control in work zones. Only typical situations are illustrated because various situations may be encountered in practice. Users may benefit from using the principles and examples provided in the Manual to develop customized Traffic Control Plans.
3. The traffic management and control requirements described and illustrated in the Manual are generally the minimum required. Additional measures may be necessary in certain circumstances and under particular conditions.
4. For situations not specifically addressed in this Manual, traffic control procedures should be established by appropriately modifying the general traffic control principles specified in the Manual.
5. No single standard sequence of signs or devices can be used as a fixed arrangement for all conditions and locations. When the Manual indicates that something shall be done, there may be circumstances where strict compliance with the requirement is not reasonable, and it will be necessary to deviate from the requirement. In these cases, written justification for the modification must be recorded and depending on the complexity of the modification, written permission may need to be granted by the Road Authority.
6. The principles provided in the Manual are applicable to both urban and rural areas.
7. Traffic conditions on urban streets are characterized by lower speeds, widely ranging traffic volumes, limited maneuvering space, frequent turns and cross-movements, significant pedestrian movement, and other obstructions. Customization of traffic control layouts is often necessary to maintain access and mobility.
8. Traffic conditions on rural highways are characterized by higher speeds and fewer access points. Advance warning is critical to provide sufficient response time in rural Traffic Control Plans.
9. The Manual provides some information about Ministry contracts and project cycles. Other Road Authorities may find it useful to modify these systems and tools for their own projects.

1.1.4 Organization and Content of the Manual

PART A – TRAFFIC MANAGEMENT

Key traffic management principles and requirements, and processes for developing consistent Traffic Management Plans for the Ministry. Other Road Authorities may use the information for reference, modifying it to suit their own requirements.

Section 2: Fundamentals of Traffic Management and Control

Key traffic management and traffic control principles and requirements, and practical processes for the consistent development of Traffic Management Plans for the Ministry.

Section 3: Traffic Management Plans

Information about Ministry project categories and the planning requirements for each category, the inspection, maintenance, and documentation of traffic control, and instructions for developing project-specific Traffic Management Plans, each of which will have one or more of these components:

- Traffic Control Plan
- Incident Management Plan
- Public Information Plan
- Implementation Plan

PART B – TRAFFIC CONTROL

Basic principles and minimum standards for the design, application, installation, and maintenance of traffic control through work zones.

Section 4: Temporary Traffic Control Devices

Information about temporary traffic control devices (signs, signals, lighting, channelizing devices, pavement markings, etc.) and the standards for their use and placement.

Section 5: Traffic Control Persons

Information about Traffic Control Persons, including their responsibilities, conduct, apparel, equipment, communications, and safety.

Sections 6 to 19: Traffic Control Layouts

General instructions, descriptions, standards, guidance, options, and diagrams regarding traffic control layouts for typical roadway projects.

APPENDICES

Appendix A: Glossary

Definitions of terms and acronyms used in this manual.

Appendix B: Standard Construction Signs

Illustrations, sizes, and applications of standard construction signs.

Appendix C: Templates for Traffic Management and Traffic Control Plans

Templates for developing Traffic Management Plans and Traffic Control Plans for Category 1, 2, and 3 projects.

Appendix D: Traffic Management Plan Audit Forms

Ministry forms for auditing a Traffic Management Plan both before the project commences and when it is under way.

Appendix E: Lane Closure Request Form

Sample of the Ministry's Work Notification/Lane Closure Request and Approval Form and link to the online form.

Appendix F: Tables A to D

Tables A to D repeated in one location for quick reference and printing.

Appendix G: Pilot Car Load Movement Guidelines

Guidelines for pilot cars used in the movement of oversize and overweight loads.

1.1.5 Using the Manual

The Manual—including any updates—shall be used for planning and implementing traffic control for work on Provincial highways.

- **Part A - Traffic Management** (Sections 2 and 3) is used for work on Provincial roadways and may be used for work on municipal roadways.
- **Part B - Traffic Control** (Sections 4 to 19) is mandatory for work on Provincial roadways and may be used for work on municipal roadways.

All users of this manual should have a thorough understanding of its contents, including the definitions found in [Appendix A: Glossary](#).

All provisions for driver, pedestrian, cyclist, and worker protection established in this Manual shall be implemented by:

- The Ministry and its contractors
- Public utilities and their contractors
- Others who have authorization to work on, or adjacent to, Provincial roadways

The Manual has several features that may help users to find the information they need:

1. Sections are numbered 1 through 19, and Appendices are labelled A through F.
2. Sections and subsections are numbered using a decimal system whereby a notation like 2.5.7 refers to Section 2, subsection 5, sub-subsection 7. Each section and subsection deals with one topic or one aspect of a larger topic.
3. Cross-references to information within the Manual are shown in italics (e.g., see [Section 5.1.1: Traffic Control Supervisor](#)), whereas other publication titles are not italicized. Hence, every italicized reference resides within the Manual.
4. Tables A, B, C, and D are shown and referenced in Sections 6 to 19, and collected together in Appendix F for quick access.
5. To find a topic in a printed Manual, use the Manual Table of Contents at the beginning of the Manual or the individual Section Contents at the beginning of each section.
6. To find a topic in the digital Manual, search for key words or phrases, or use the Manual Table of Contents or individual Section Contents. To navigate to cited websites, click on the links.

1.1.6 Updating the Manual

1. Insert new and revised pages into printed copies of the Manual as soon as they are available. Remove and discard obsolete pages.
2. The insertion of new and revised pages should be recorded in the Manual Update Record on the page following the cover page at the beginning of the Manual.
3. Users are encouraged to contribute to this process by submitting suggestions for corrections and new content to the Director of Traffic and Safety Engineering, Ministry of Transportation and Infrastructure at MoTITMM@gov.bc.ca.

1.2 Road Authority and Prime Contractor Responsibilities

1.2.1 Jurisdiction

Provincial legislation and municipal bylaws authorize Road Authorities to control traffic for work.

- Federal roadways, such as highways through National Parks, fall under the jurisdiction of the Federal Government.
- The Ministry is the Road Authority for, and has jurisdiction over, all Provincial highways, as well as roads outside incorporated areas.
- In municipalities, the Road Authority is the municipal government, which has jurisdiction over the entire incorporated area except for the Provincial highways.

1.2.2 Work Permits

The Road Authority shall authorize the work or provide a work permit before any work zone or lane closure may be established. Road Authorities may grant “continuing” permits for frequent activities, such as those undertaken by utility providers.

See [Appendix E: Lane Closure Request Form](#) for a sample of the Ministry’s Work Notification/Lane Closure Request and Approval Form and a link to the online form, which can be populated online and printed for submission to the Ministry.

1.2.3 Traffic Control Responsibilities

The Road Authority shall clearly assign traffic control responsibility in writing through a permit, contract, or protocol agreement to ensure that:

- All supervisors and crews are thoroughly familiar with and trained in the applicable safe work practices.
- Immediate and decisive action is taken when safe and approved work methods are not followed.
- Each crew member wears the required personal safety equipment and apparel when working on or crossing the highway.
- Traffic control is provided where necessary by using temporary traffic control devices and/or traffic control persons, as outlined in this Manual.

The responsibilities identified on the following pages shall be assigned and implemented to ensure a successful Traffic Management Plan. The assignment of specific individuals to specific roles will vary with the size and complexity of the work.

1. Road Authority

For contracted works, the Road Authority identifies hazards, provides known information to the Prime Contractor, issues permits or authorization to commence work, periodically audits traffic control setups on the roadway, and monitors traffic issues.

1. If the Road Authority is supervising and directing work being completed by in-house staff, the Road Authority is also the Prime Contractor.
2. If the Road Authority is using a Consulting Services contract where traffic control is to be managed by the Consultant, then a [Notice of Assignment](#) should be completed, designating the Consultant as the Prime Contractor.

2. Prime Contractor

For all works on Provincial highways, the Ministry designates an individual or organization as the Prime Contractor—through a signed agreement, such as the [Notice of Assignment](#)—and the Prime Contractor is responsible for traffic management and control.

Many utility companies operate on Ministry right-of-way (electrical, telecommunications, gas, etc.). Work carried out by utility companies on Ministry right-of-way is tied directly to the conditions specified in the permit, including the [H1080 – Work Notification/Lane Closure Request and Approval](#) form (see [Appendix E](#)). The permit and its associated conditions that specify requirements for utility operations on Ministry right-of-way are issued by the Ministry of Transportation and Infrastructure’s local District office where the utility company operates.

For the purposes of this Manual, the Prime Contractor is the organization directly constructing or maintaining works on a Provincial highway and is responsible for:

1. Obtaining Ministry authorization to work on the roadway;
2. Developing an acceptable Traffic Management Plan; and
3. Implementing the Traffic Management Plan in accordance with Ministry requirements.

3. Management

Traffic control activities associated with work should have a management structure for these activities to ensure that all supervisors and workers are thoroughly familiar with, and trained in, the applicable safe work practices.

Management and site supervision personnel shall monitor the effectiveness of traffic control, take immediate and decisive action when safe and approved work methods are not followed, and document and make necessary changes as issues arise.

Individuals assigned traffic control responsibilities shall have adequate knowledge and training in all facets of traffic control, including:

- traffic control operations (those conducting traffic control shall be trained in a manner acceptable to WorkSafeBC)
- Part 18 of WorkSafeBC’s Occupational Health and Safety Regulation
- the content of this Manual, other relevant publications and technical circulars, and manuals and regulations that govern other jurisdictions (when and where required by particular projects)

4. Site Supervisor/Foreman/Superintendent

The Site Supervisor/Foreman/Superintendent shall ensure that:

- Each crew member is familiar with the Traffic Control Plan.
- Each crew member wears the required safety apparel and uses the required equipment when working on or crossing the highway.
- The work area is protected by implementing the Traffic Control Plan which uses various signs, channelizing devices, and other temporary traffic control devices and measures described in this Manual.

The Site Supervisor/Foreman/Superintendent cannot be a Traffic Control Manager, Traffic Control Supervisor, or Traffic Control Person for the project unless the dual functions are authorized by the Road Authority in the contract or permit.

5. Traffic Engineer

The Traffic Engineer is a Professional Engineer who is licensed in British Columbia and qualified and experienced in traffic management planning and highway safety. They are a requirement for Category 3 Traffic Management Plans, and may be required, as specified by the Road Authority, on Category 2 Traffic Management Plans.

Traffic Engineers may also sign-off in cases where minimum standards cannot be met. In all cases, the matter shall be discussed with the Road Authority and documented.

6. Traffic Control Manager

The Traffic Control Manager is appointed by the Prime Contractor, and is responsible for preparing, implementing, and managing the Prime Contractor's Traffic Management Plan and sub-plans. This includes reviewing, evaluating, and approving the details in the Traffic Control Plan, including the traffic control layouts.

These are the typical duties and responsibilities of the Traffic Control Manager:

- fully implements the Traffic Control Plan
- monitors traffic operations to determine the effectiveness of the Traffic Control Plan
- ensures that the Traffic Management Plan remains current
- oversees modifications to the Traffic Management Plan as required by changes to the construction schedule, accommodation of special events, and changes to sub-plans
- ensures that daily traffic control logs are maintained
- exercises full line authority over all Traffic Control Persons on the work site
- finalizes traffic control measures with the Prime Contractor's Traffic Engineer where these are required by the Road Authority or the standards in this Manual
- sets up and implements a monitoring schedule for both active and inactive work periods throughout the course of the project
- directs the Prime Contractor's Incident Management Plan
- directs the Prime Contractor's Public Information Plan
- directs the Prime Contractor's Implementation Plan

- attends regular meetings with the Road Authority Representative on behalf of the Prime Contractor to discuss project performance, issues, and plans

The role of Traffic Control Manager should be assigned only to a qualified person who is knowledgeable about traffic management principles and requirements, and who has suitable traffic management work experience or training. The Traffic Control Manager may be an employee of the Prime Contractor or a sub-contractor to the Prime Contractor, and may be the designated Traffic Control Supervisor or another qualified person.

7. Traffic Control Supervisors and Traffic Control Persons

For the roles and responsibilities associated with these positions, see [Section 5.1.1: Traffic Control Supervisor](#) and [Section 5.1.2: Traffic Control Persons \(TCPs\)](#).

1.2.4 Road Work Authorization

The Road Authority authorizes the Prime Contractor to work on a Provincial (or municipal) roadway where the work will impact road users. There is typically conditions (requirements) associated with the authorization which may be outlined in a:

- **Contract:** Traffic management requirements may form part of the contract conditions.
- **Permit to Construct Works upon Highways/Roadways:** Traffic management requirements may form part of the permit conditions.
- **Lane Closure Request/ Acceptance:** The Ministry's Work Notification/Lane Closure Request and Approval Form may be useful where traffic is impacted but no physical works are being constructed that require a permit (see [Appendix E: Lane Closure Request Form](#)).
- **Letter of Authorization:** May be used when no standard form suits the circumstances. Care should be taken to ensure that the appropriate requirements and conditions are communicated to the Prime Contractor in writing when authorizing work on a highway.

1.2.5 Plan Submission and Review Process

The Prime Contractor shall plan and document the Traffic Management that will be implemented based on the requirements set by the Road Authority. No work may be performed on the roadway unless the Prime Contractor's Traffic Management Plan meets the requirements and has been reviewed and accepted by the Road Authority.

[Section 2.5: Establishing Work on Roadways](#) outlines the submission and review process in detail used by the Prime Contractor.

PART A – TRAFFIC MANAGEMENT

Section 2: Fundamentals of Traffic Management and Traffic Control

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PART A – TRAFFIC MANAGEMENT

Section 2: Fundamentals of Traffic Management and Traffic Control

2.1 Principles of Traffic Management

2.1.1 Traffic Management Goals and Objectives

The goal of effective traffic management is to **protect workers** and **accommodate road users** while work is underway on roadways. Temporary closures or peak-period capacity reductions are not acceptable on many roadways, and even minor traffic disruptions may have efficiency and safety implications.

Identifying potential impacts and addressing them in the planning process will assist with the establishment of project-specific traffic management objectives and appropriate traffic control, and these in turn will help to ensure successful work.



Figure 2.1: A Work Zone

Effective traffic management ensures that:

- Project and site-specific issues are accommodated.
- Potential traffic impacts are reviewed and mitigated.
- Stakeholders are notified of potential impacts.
- Evaluation and modification occurs as needed.

When planning a project, it is important to use a **clear, consistent, and structured** process for developing the Traffic Management Plan so traffic issues are carefully considered and the Plan is reviewed for suitability. This Manual provides this process for Prime Contractors, Ministry staff, and other Road Authorities.

2.1.2 Traffic Management Principles

Four primary questions should be addressed when considering traffic management for a project:

1. What type of work is occurring?
2. What is the likelihood of traffic delays?
3. What special circumstances must be accommodated?
4. What type of traffic control is required for the work?

2.1.3 Traffic Management Process

The process for planning and evaluating traffic management on every project should consider the following:

1. Identification of the work.
2. Clear definition of roles and responsibilities.
3. Development of clear and consistent Traffic Management Plans appropriate to the complexity of the work and the site.
4. Regular and effective evaluation of Traffic Management Plans.
5. Management and documentation of ongoing changes.

As illustrated in [Figure 2.2: Traffic Management Process Life Cycle](#), traffic management issues should be considered during the project design phase to identify the appropriate project category and develop the contract.

The Ministry's internal process traffic management plan acceptance for major works projects is outlined in [Figure 2.3: Ministry TMP Acceptance Process for Major Works – Category 1 and 2](#) and [Figure 2.4: Ministry TMP Acceptance Process for Major Works – Category 3](#).

A Traffic Management Plan is a dynamic document. Once work is underway, performance should be monitored, and plans modified to reflect changing traffic management issues, construction schedules, and deadlines.

Once the project is completed, the effectiveness of the Traffic Management Plan should be assessed, and the lessons learned incorporated into the planning for future projects.

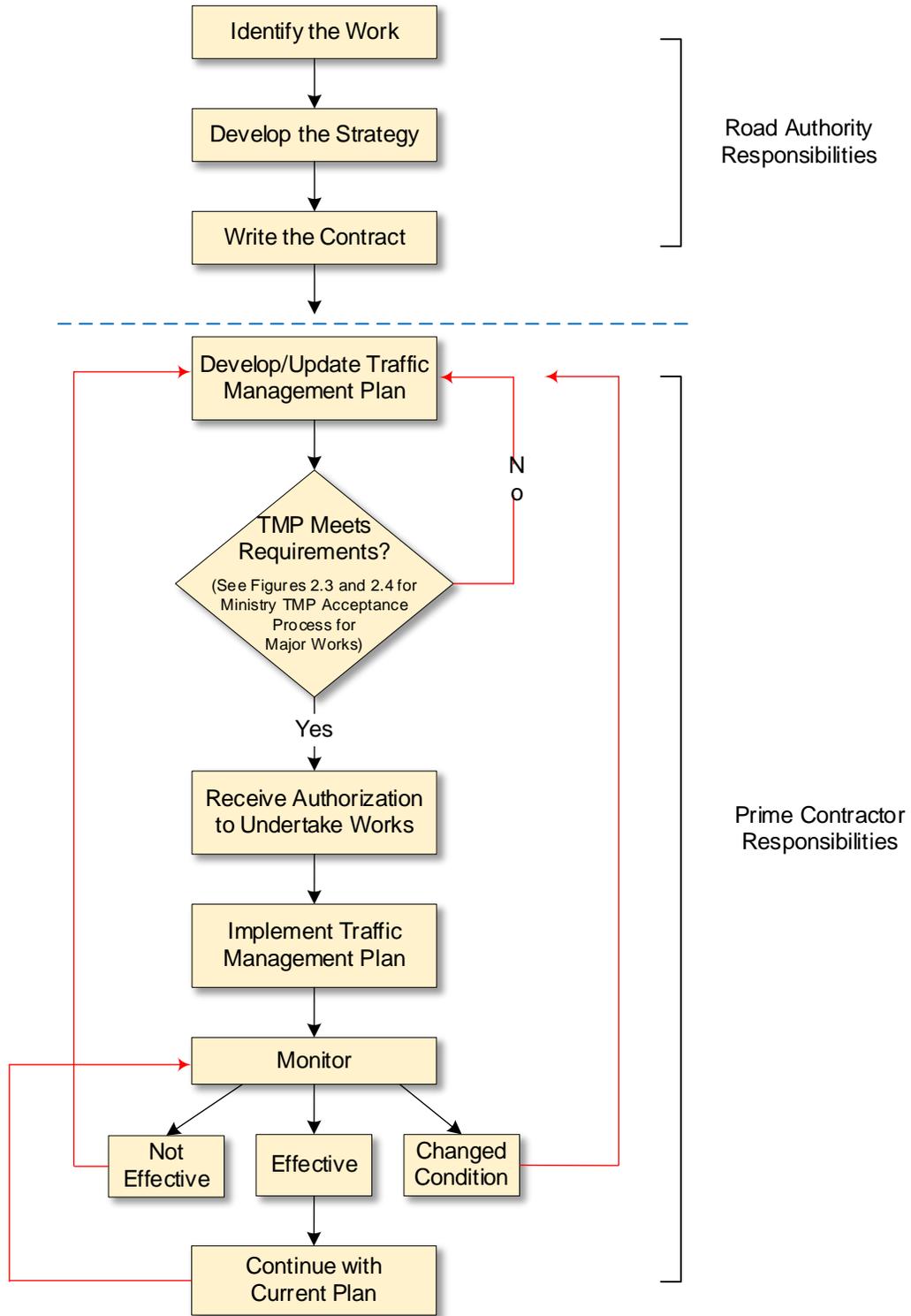


Figure 2.2: Traffic Management Process Life Cycle

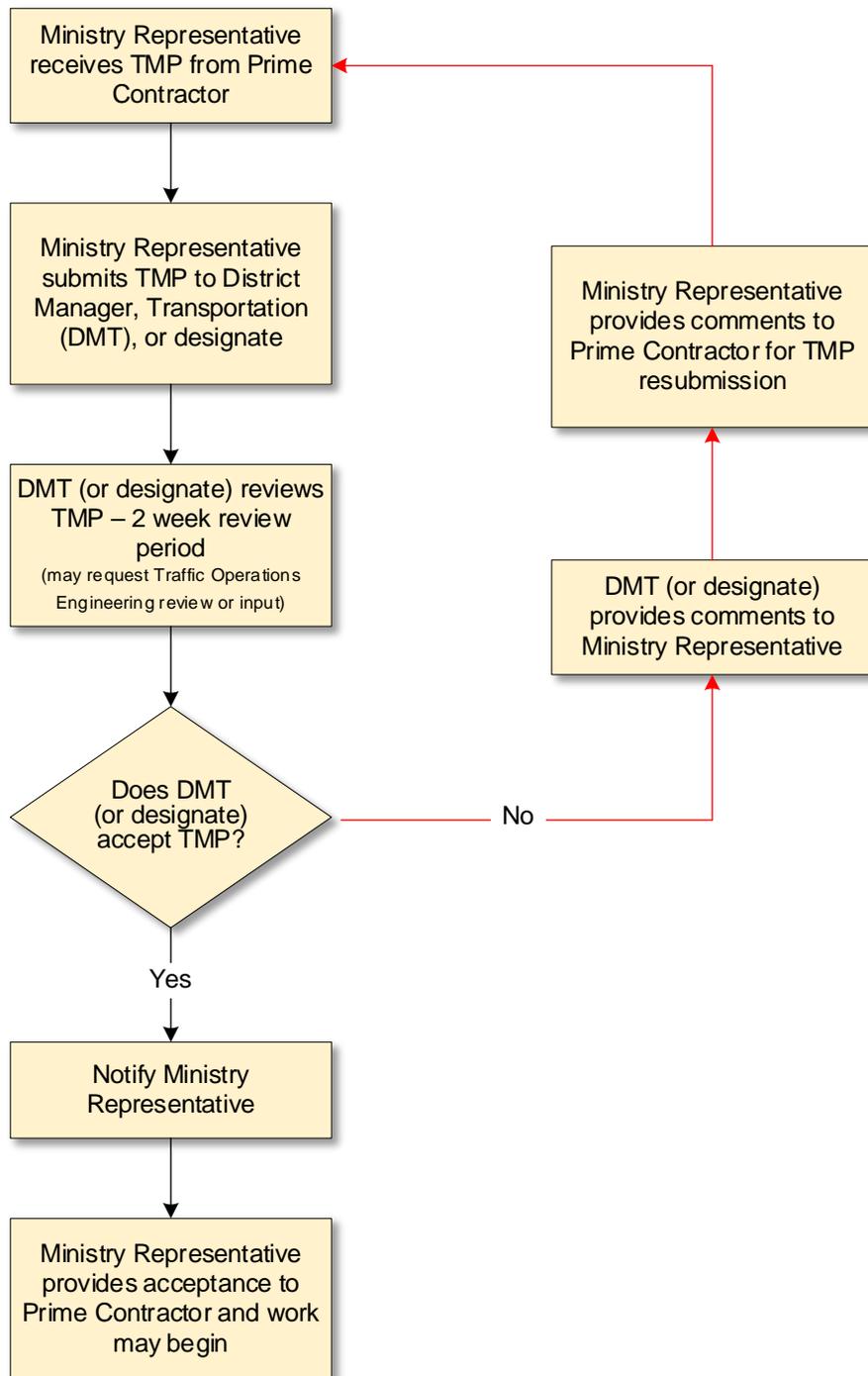


Figure 2.3: Ministry TMP Acceptance Process for Major Works – Category 1 and 2

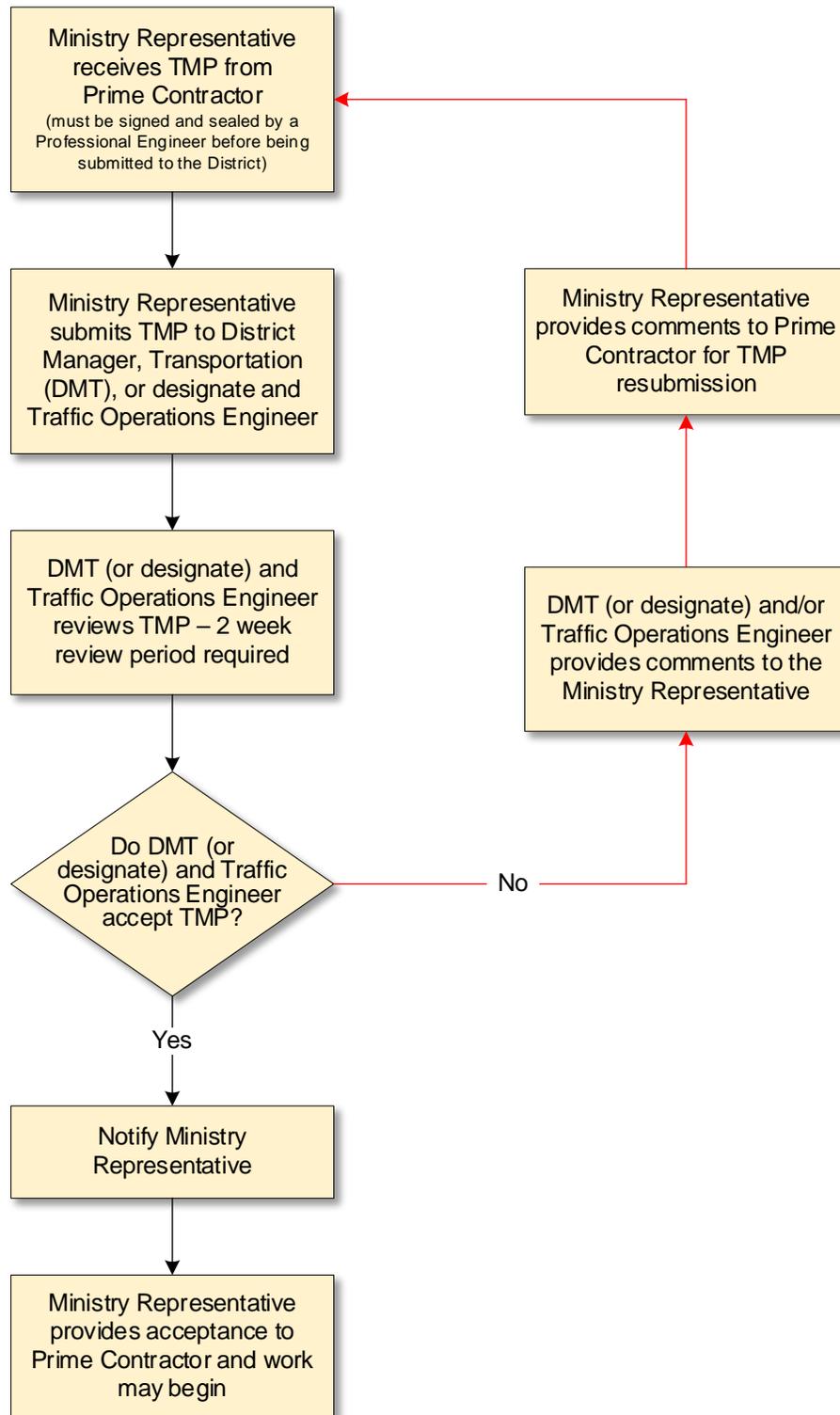


Figure 2.4: Ministry TMP Acceptance Process for Major Works – Category 3

2.2 Principles of Traffic Control

Traffic Control	The implementation of the Traffic Management Plan through the effective use of temporary traffic control devices to protect workers and move road users safely through the work zone.
------------------------	---

2.2.1 Hierarchy of Controls

Use the hierarchy of controls below to manage interaction between road users and the work zone. Most work zones will require a combination of these controls.

1. Elimination Controls

Completely eliminate public traffic from the work area and construction traffic through constructed detours, alternate routes, or otherwise isolating the work zone.

2. Engineering Controls

Use prescribed temporary traffic control devices and layouts to effectively control traffic through a work zone, permitting public traffic and construction to interact without the use of Traffic Control Persons.

3. Administrative Controls

Schedule the work at times when traffic volume are low, reducing the exposure of public traffic to construction.

4. Traffic Control Persons

Use Traffic Control Persons where the strategies described above have been considered and deemed unsuitable to effectively manage traffic.

2.2.2 Planning and Implementation by Trained Persons

Traffic control is planned, designed, approved, selected, installed, operated and maintained by trained persons. Complex field layouts require comprehensive plans and the services of an experienced traffic specialist.

Training is usually obtained through course work, programs, and experience in the field of Traffic Control or Traffic Engineering. Traffic Control Persons shall retain evidence of traffic control training that is, at minimum, acceptable to WorkSafeBC.

2.2.3 Minimum Disruption to Road Users

Work on roadways can cause inconvenience and significant disruption for road users. Road user movement and time through a work zone should be inhibited as little as reasonably possible, while addressing all known hazards.

1. Driving conditions through work zones should be as similar as possible to normal driving conditions.
2. Scheduling of work should consider congestion and delay.
3. Keep reduced construction speed limits reasonable to the given hazards and road conditions.
4. Provide notification to all stakeholders of the work.
 - Various media, including newspaper, radio, internet.
 - Businesses and residences for which access will be affected are provided with sufficient advance notice to plan alternative actions or routes.
 - Emergency services are considered and accommodated.
 - Railroad, transit, and commercial vehicle use is accommodated or alternative routing is planned.

2.2.4 Clear, Positive Direction for Road Users

The measures implemented for traffic control should be designed to provide clear, positive direction, as if every road user were approaching the area for the first time.

1. Drivers should be provided with positive guidance in advance of and through work zones by means of temporary traffic control devices that are effective under varying conditions of light and weather.
2. Channelization of traffic should be accomplished by using pavement markings, signing, flexible posts or drums, tubular markers, cones, delineators, barricades, and other light-weight devices.
3. Pavement markings should be modified as needed for long-duration work.
4. When the use of temporary traffic control devices is inadequate for clear direction, Traffic Control Persons should be considered.
5. When traffic control devices are not needed, they shall be removed, covered, or turned.

2.2.5 Accommodation of Other Road Users

All road users should be accommodated through the work zone. Typical traffic control is directed towards drivers of passenger and commercial vehicles.

Motorcycles

Road surface conditions can impact motorcycle operation more so than other vehicles. This is particularly associated with resurfacing projects involving milling and paving.

Transit and School Buses

Discussions with the local Transit Authority or School District should discuss the impacts of the work and address the location of alternative passenger pick-up and drop-off points, if required. It can be expected that groups of bus users can congregate within the work zone. Accommodations may be required for storage and protection of these users.

Emergency Vehicles

Emergency vehicles shall be accommodated through the work zone at any time. This includes volunteer responders (i.e. fire fighters) who may be in personal vehicles.

Police Enforcement

Where there is a need for enhanced police enforcement in a work zone, consideration should be given to providing safe areas where vehicles can park and where enforcement officers can pull vehicles over.

Pedestrians

Provisions should be made to accommodate pedestrians through work zones. Temporary pedestrian facilities should include accessibility features consistent with those present in the existing facility.

Mobility-assisted pedestrians, wheelchairs, walkers, or scooters require smooth and solid transition and running surfaces. Care should be taken to prevent tipping.

Visually-impaired pedestrians may require some additional guidance. Barricades should be used to block off closed areas and a distinguishable “path” of tubular markers should be erected for the pedestrians to follow. Assistance may also be provided by a Traffic Control Persons or designate.

Cyclists

Provisions should be made to accommodate cyclists through work zones. Consideration should be made to the road surface and work zone or detour length.

Under the provisions of the Motor Vehicle Act, cyclists have the same rights and duties as the operators of motor vehicles so the signage and traffic control measures used for drivers also apply to cyclists.

For more information, see [Section 18: Traffic Control Layouts – Bicycle Lanes](#).

2.2.6 Maintenance of Traffic Control Devices

Traffic control devices shall be inspected and maintained during both active and inactive work to ensure that they are not missing, and that they are clean, properly positioned, and effective in all weather and light conditions.

The frequency of inspection will be determined by the operational needs of the project. The operational needs are directly related to factors such as:

- highway functional classification,
- traffic volumes,
- number and choice of traffic control devices deployed, and
- duration of work (active and inactive periods)

The higher the values for these factors, the more frequent the inspections, which should be documented in a Quality Control Plan.

2.2.7 Roadside Safety

Maintaining roadside safety requires constant attention during the project life cycle due to the potential for hazard changes. Traffic control for the project should be modified as required to ensure it is effective in protecting workers and road users. In addition:

- Traffic control devices shall be crash-worthy (American Association of State Highway and Transportation Officials (AASHTO) [Manual for Assessing Safety Hardware](#) (MASH) tested) and not create a greater hazard than the hazard against which they are intended to protect road users.
- A travelled roadway should always be maintained by keeping it clear of construction equipment, materials, and devices as practical. The travelled roadway and any equipment should be clearly marked and delineated as required.
- The shoulder area adjacent to the travelled lanes should be maintained as unencumbered as practical. Due to highway right-of-way constraints, the shoulder area may have to be used for the storage of construction equipment and materials.
- Clear zone requirements are not applicable in work zones.
- The storage of construction equipment and materials should be as far from the travelled lanes as possible unless site constraints require them to be placed on the shoulder. In these cases, they shall be clearly marked and delineated.
- Drop-offs and excavations require special considerations (see [Section 6.5: Treatment of Drop-Offs and Travel Lane Excavations](#)).

Elements of roadside safety are discussed throughout this manual.

2.2.8 Traffic Control during Inactive Work

Traffic control shall be maintained during periods of inactive work, including during seasonal shut downs. When a work zone is left inactive, these steps should be taken:

1. Traffic control should anticipate the most adverse conditions that could reasonably be expected to occur.
2. Store construction equipment and materials clear of the travelled roadway or mark and delineate the area around them.
3. Ensure that all temporary traffic control devices are secured against weather and vandalism.
4. Remove, cover, or turn off any temporary signs or devices that are not applicable. Reinststate any permanent devices which are now applicable.
5. Establish a schedule to monitor and maintain the site during inactive work.
6. Make available to the Road Authority the name and phone number of individuals who can be reached 24/7 to respond promptly to concerns.

2.2.9 Work near Railways

Railways are under the jurisdiction of the railway owner. Any work that may impact railway track or right-of-way requires authorization from the railway owner.

Issues for consideration include:

- the potential queuing of traffic onto railway tracks
- works affecting track operations (e.g., blasting rocks onto tracks)
- disruption of traffic signals with pre-emption operations
- Transport Canada requirements for working around railways

See [Section 7.17: Work Near a Rail System Grade Crossing](#) for additional guidance.

2.2.10 Work near Accesses and Driveways

It is necessary to consider access and egress from private, commercial, and public locations.

Prior to the commencement of work, discussion with business and property owners is highly recommended to facilitate a coordinated and systematic approach to managing traffic flow into and out of the businesses/residential properties. This may include:

- controlling access and egress to the properties
- providing alternative access with supplemental signage
- placing signage within the properties to assist vehicular movement
- assessing sight distance
- establishing “closure” times or planning work in the affected area to minimize disruption to customers/residents
- limiting access

2.3 Driver Information in Work Zones

Processing roadway information in a timely manner is essential to driving safely through a work zone. Inappropriate or unclear messages and/or the incorrect placement of signs, markings, and other devices may mislead and confuse drivers.

There are usually three types of **traffic control messages** in work zones:

1. Warnings about potential hazards
2. Postings of maximum speeds and applicable regulations
3. Delineation of the traveled roadway

Positive guidance for drivers is the process of giving **clear, correct, accurate, relevant, and timely information, and visual cues** through the work zone by means of temporary traffic control devices.

2.3.1 Manage Driver Expectations

There are three types of driver expectations:

1. **Continuity Expectation.** Drivers expect that traffic control devices used in one situation will be used in all situations. For example, a Traffic Control Person Ahead sign is always used in advance of a Traffic Control Person.
2. **Event Expectation.** Drivers expect that if something has not happened, it will not happen. Over time, drivers develop an expectation of various unique events that occur on roadways.
3. **Timing Expectation.** For events that recur in cycles, drivers expect that the longer a state occurs, the more likely it is to change. For example, a stale green signal display can be expected to turn yellow and then red.

Providing consistent driver information will evoke consistent driver behaviour. Displaying the same accurate message repeatedly motivates drivers to take the same action each time they see the sign or device.

2.3.2 Manage Driver Workload

Driver work load relates to the ability for drivers to process information. Driver workload increases through work zones. Providing too much information can result in one of three driver responses:

1. **Doing the wrong thing.** A driver turns in the wrong direction because the more important directional sign is lost among various other signs.
2. **Slowing or stopping.** A driver is distracted by the work activity or overwhelmed with too many signs and slows or stops to try and process the information.
3. **Taking a chance.** A driver is confused but continues and may or may not make the correct decision.

2.3.3 Manage Driver Sight Distances

Driver sight distance is the distance that a driver can see unobstructed along the highway. Driver sight distances are required for the driver to see and respond to conditions through the work zone. The required sight distance increases as the speed of the vehicle increases.

Positioning of devices should always consider the available sightlines of an approaching vehicle so road users can adequately respond.

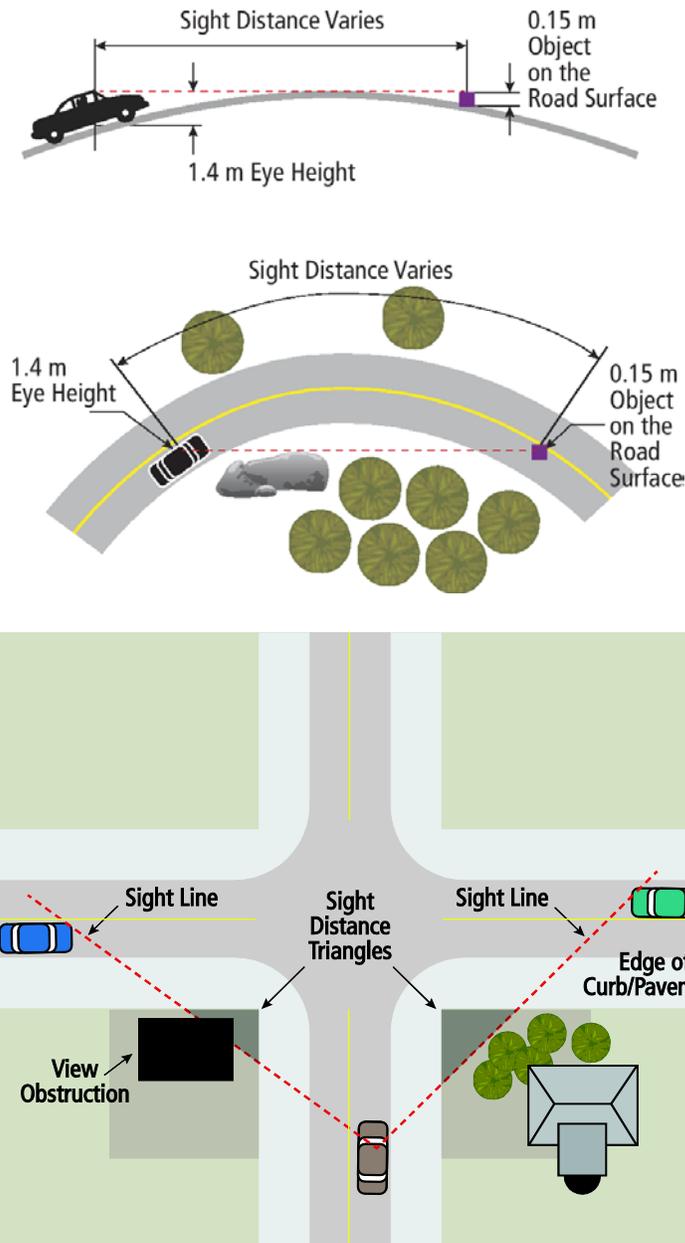


Figure 2.5: Driver Sight Lines

2.4 Management of Speed

Not all road work requires a reduction in the posted speed. Temporary traffic control devices are generally more effective than construction speed limits in drawing attention to the need for caution through work zones. A decision to reduce the existing posted speed limit should be clearly justified.

2.4.1 Basic Guidelines

Speed zones are effective when they appear reasonable to drivers. To make reduced speed zones credible and acceptable:

- Maintain consistency by complying with the standards in this Manual.
- Speed zones remain short and relevant to the nature of the work.
- Ensure that all speed zone signs are covered or removed when not required.

Reduced speed zones should be used:

- In conjunction with other signs or devices required for site-specific conditions
- To complement more effective traffic control
- When temporary road conditions are unsafe at the existing posted speed

To maintain driver cooperation, avoid unnecessarily restrictive requirements such as excessive length, excessive hours for which the zone is in effect, and specified speeds which are too low. The length of the speed zone is typically less than the length of the work zone.

When a further speed reduction is required within a reduced speed zone, signs and devices should be installed based on the higher speed. See [Section 6.6: Positioning of Temporary Traffic Control Devices](#) for details.

2.4.2 Construction Speed Zones

A Construction Speed Zone is established through a Traffic Management Plan to reflect hazards due to the nature and the type of work taking place.

A Construction Speed Zone requires the authorization of the Road Authority and is established by regulatory signs. It may be in place 24 hours a day, so it is important to ensure that it is appropriate and effective during inactive work. The Construction Speed Zone shall be modified or removed as needed.



Figure 2.6: Typical Construction Speed Zone Start and End Signage

1. Construction Speed Zones are identified with Maximum Speed R-004 signs and Construction Speed Zone C-080-T.
2. The Min \$196 Fine – Speeding in Work Zones C-082 sign is a speed management tool for use when drivers fail to adhere to the speed limit.
3. The Work Zone Ends C-088 sign marks the end of the work zone.
4. The Thank You Resume Speed C-086-1 or C-086-2 sign may follow C-088 sign to advise drivers that they may resume the regulated posted speed. A Maximum Speed Limit R-004 sign showing the regular posted speed may be installed.

2.4.3 Temporary Speed Zones

A Temporary Speed Zone is a short duration speed reduction typically used for maintenance, surveying, and other work which does not have a significant impact to the roadway yet workers are present on, or adjacent to, the road surface.

Temporary Speed Zones require the approval of an onsite Supervisor, and are signed by a Survey Crew Working C-002-1 or a Crew Working C-002-2 sign, and show the appropriate speed for the work.

The C-002-2 may be used as a supplement to an R-004 Construction Speed Limit to remind drivers of the reduced speed as they approach the work area.

The end of a Temporary Speed Zone is marked with either a Thank You Resume Speed C-086-1 sign or a Maximum Speed R-004 sign. The temporary speed zone shall be removed when no longer required.



Figure 2.7: Typical Temporary Speed Zone Start and End Signage

2.4.4 Determining the Need for a Speed Reduction

Effective work zone speeds depend on the type of work, the change in road characteristics, and the proximity of workers to adjacent traffic. The construction speed limit shall not exceed the regular posted speed limit.

Obtain a clear understanding of these factors to determine appropriate speed zones:

- type of work and traffic control (traffic control persons or signals)
- roadway classification and surface
- type of traffic and volumes
- accesses and land use
- sight distances (fog, smoke, or dust)
- detours

On roadways with a regular posted speed limit of 80 to 120 km/h, consider reducing the speed limit when:

- Workers on foot are less than 6 metres from traffic with no intervening physical barrier, and average daily traffic volumes exceed 12,000 vehicles per day.
- There are changed traffic conditions on the site, such as detours, a reduced number of lanes, and varying surfaces.
- There are work vehicles entering or leaving the roadway.
- TCPs are directing traffic for planned work, the construction speed limit shall be ≤ 70 km/h.

On roadways with a regular posted speed limit of 50 to 70 km/h, consider reducing the speed limit when:

- Workers on foot are less than 3 metres from traffic with no physical barriers.
- There is significant interaction between work vehicles and through traffic.
- There is a reduced standard of alignment due to the road works.
- There is a loose surface such as gravel or a newly sprayed bitumen seal.
- Traffic is adjacent to an excavation.

On roadways with a regular posted speed limit below 50 km/h, consider reducing the speed limit when:

- There is a severe change in alignment.
- The work area is in a high-volume urban area where a variety of activities are competing for drivers' attention.

2.4.5 Transition Speed Zones

There are two options for signing transition speed zones:

Option 1 – Stepped Speed Zone Drop

Transition speed zones, approximately 500 m long are used when the reduction to the speed limit is greater than 30 km/h. For example:

- For a drop of 40 km/h, the transition speed should be 20 km/h above the Construction Speed Zone limit.
- For a drop of 60 km/h, the transition speed should be 30 km/h above the Construction Speed Zone limit.

Option 2 – Singular Speed Zone Drop using Additional Warning

An alternative approach to signing construction speed limits with a speed reduction > 30 km/h and ≤ 50 km/h is to provide additional advance warning through the installation of a Construction Speed Limit Ahead C-128 sign and a Distance C-130 T tab.

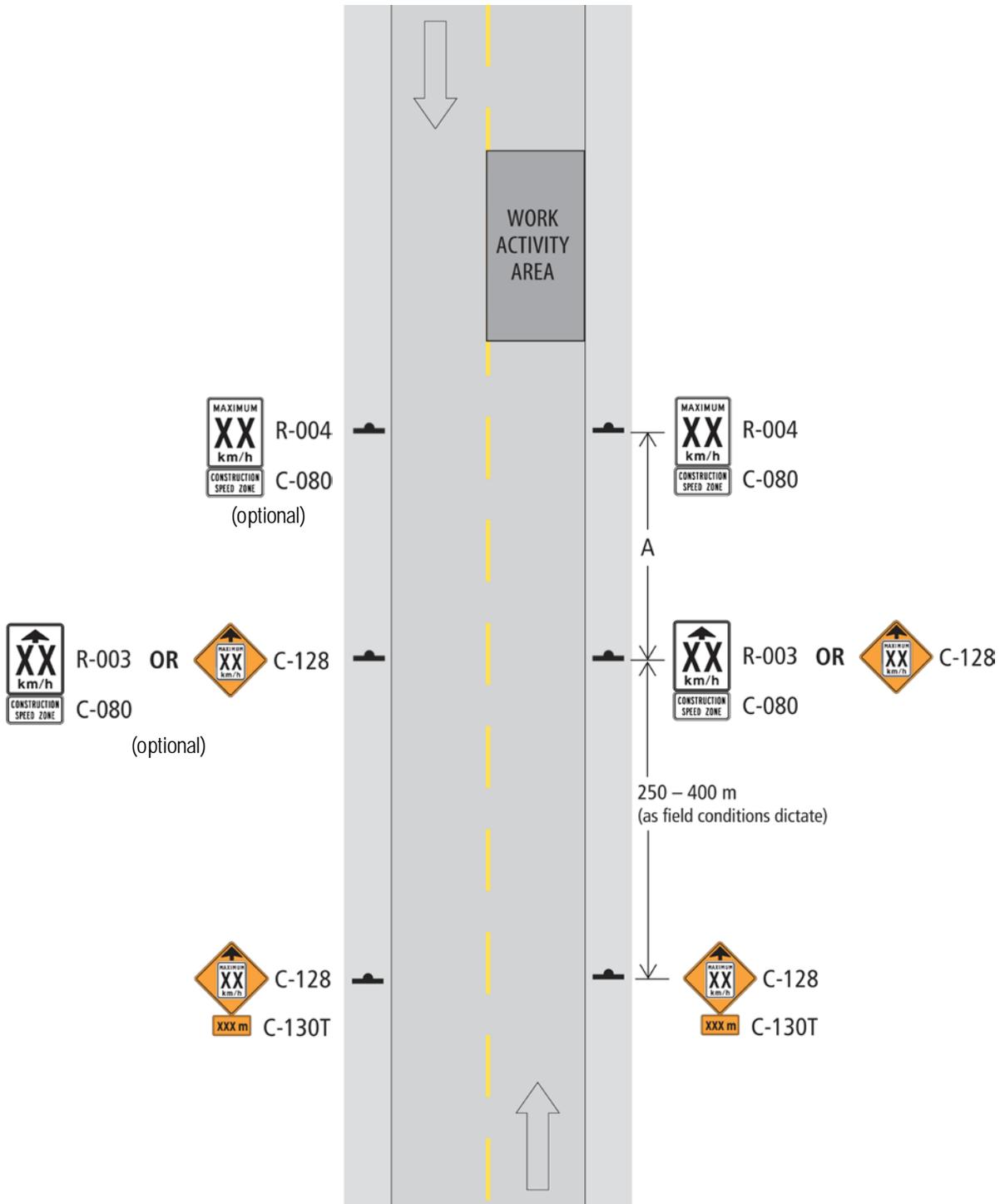
These signs are installed in advance of the Speed Limit Ahead R-003 (or additional C-128 sign) and Speed Limit R-004 signs establishing the construction speed limit. [Figure 2.8: Singular Speed Zone Drop Using Additional Warning](#) shows an example of how these signs should be used.

This process provides consistent messaging of the construction speed limit and replaces the transition speed zone. It suits work zones which have a distinct change in the roadway environment wherein a transition speed zone may not appear reasonable to a driver. See Technical Circular [T-09/14 Speed Zone Transition Signs](#) for more information.



C-128
C-130-T

Figure 2.8: Singular Speed Zone Drop Using Additional Warning



2.4.6 Assessing Speed Zone Effectiveness

If drivers are disregarding the construction speed zone, consider re-evaluating the following items.

- **Site characteristics:** Speed zone signs are clearly visible amongst other temporary traffic control devices. The grade of the roadway may necessitate additional advance warning.
- **Placement of speed zone signs:** The construction speed limit signs should be positioned approximately 10 seconds of travel time in advance of the work activity area.

Table 2.1: Distance Travelled Based on Speed and Time

Construction Speed (km/h)	10 Seconds of Travel Time
50	140 metres
60	170 metres
70	200 metres
80	220 metres
90	250 metres
100	280 metres
110	310 metres
120	330 metres

- **Unnecessarily long speed zones:** The construction speed zone should only encompass the area where the hazards exist from the work. Speed zones should be kept as short as practicably possible.
- **Speed zone speed limit too fast:** Drivers approaching the work zone too quickly and react unsafely. This could be a sign of inadequate perception time, stopping distance, and interpretation of the traffic control.
- **Speed zone speed limit too slow:** Driver disrespect of the construction speed limit leads to heavy queuing, improper passing or tailgating. The construction speed limit should always reflect the actions of a reasonable driver. A reasonable speed limit builds respect for all traffic control, improving overall safety through the work zone.
- **Conspicuousness of speed zone signs:** Keep traffic control simple, positive, and directive, with little need for drivers to make choices, minimizing driver workload. Speed zones signs are regulatory and therefore of high importance when placing traffic control devices.
- **Relevance of speed zone:** Reduced speed zone signs must be removed, turned, or covered when they are not needed.

2.4.7 “Slow Down, Move Over” Regulation and Work Zones

The “Slow Down, Move Over” Regulation in the Motor Vehicle Act requires that drivers reduce their speed when approaching or passing an official vehicle. In addition, the driver must move their vehicle into another lane if safe to do so.

An official vehicle is one which displays a flashing red, blue, white, or amber light.

The Motor Vehicle Act also requires that when work is occurring on a roadway, traffic control devices shall be installed to indicate that persons or equipment are on the roadway. Therefore, for planned and scheduled construction/maintenance activities, the Slow Down, Move Over Regulation does not replace the necessity to establish temporary traffic control, including a construction speed limit, if warranted.

2.4.8 Highway Work Zones – Split Direction of Travel

On divided highways or multilane roadways where the work zone is impacting one direction of travel, the Road Authority may establish a split speed zone where the speed limit differs for each direction of travel.

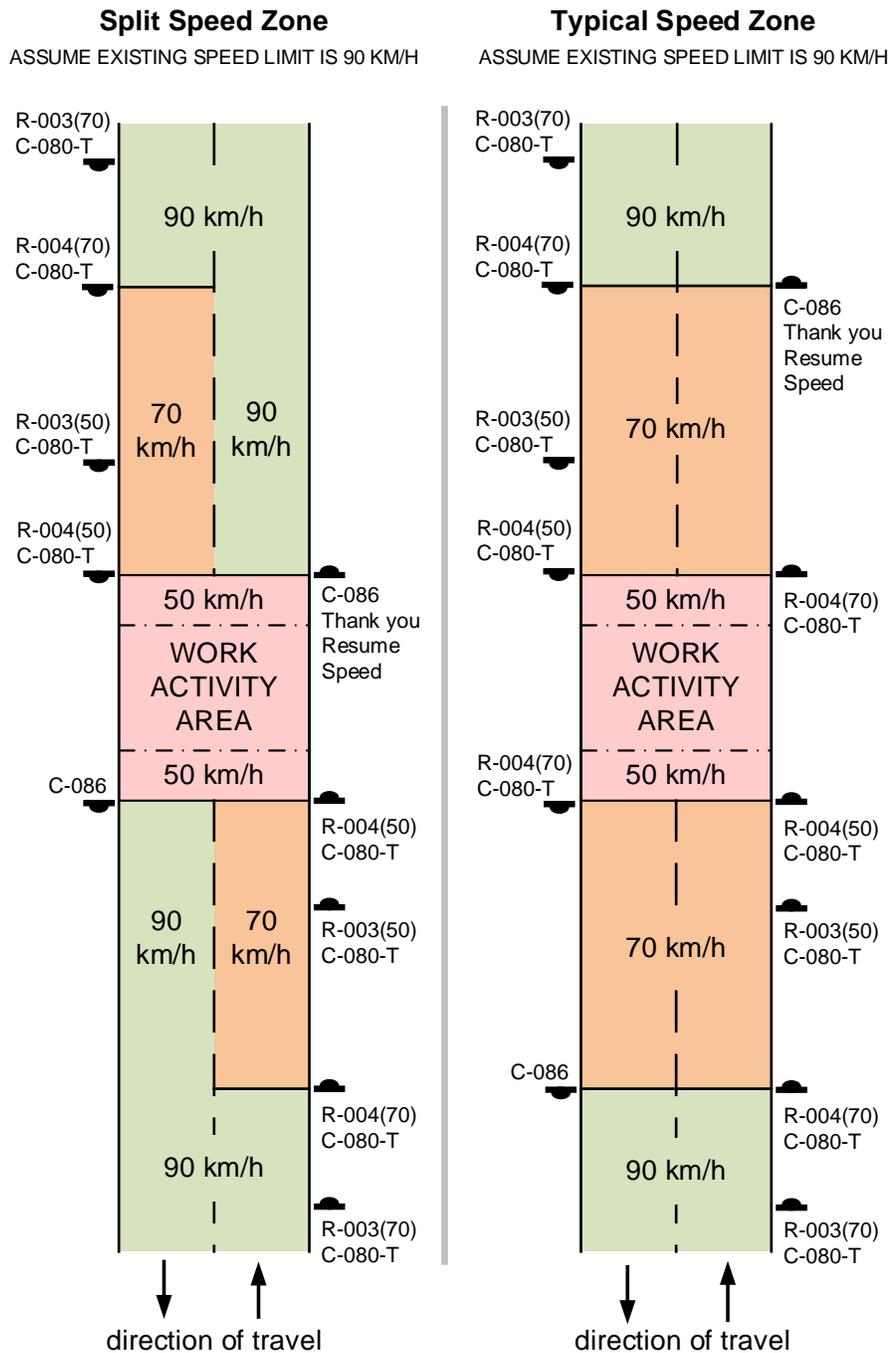


Figure 2.9: Split Speed Zone and Typical Speed Zone

2.5 Establishing Work on Roadways

This section outlines the requirements and processes used by the Road Authority and Prime Contractor in establishing and approving works on roadways.

2.5.1 Road Authority Requirements for Work

The Road Authority sets out the requirements of the Prime Contractor to be accommodated in the Traffic Management Plan.

Each Road Authority has its own policies, specifications, requirements, and systems for Traffic Management Plans. These may include:

- hours of work, acceptable delay, and lane closures
- acceptable temporary traffic control devices
- notification requirements
- municipal approval
- review requirements
- requirements for plan review, updates and modifications
- minimum requirements for Traffic Management Plan documentation

For Ministry projects, these requirements are developed by District Staff (Area Manager, Operations Manager, etc.) and, in more complex situations, in consultation with Traffic Engineering. The District Manager of Transportation, or designate, shall approve the closure of travel lanes for any road works on Provincial Highways.

For non-Ministry initiated projects, it is the responsibility of the agency, group, or other Road Authority engaging the work to define the Strategy and provide it to the Ministry for authorization to close the road and/or commence the work (see [Appendix E: Lane Closure Request Form](#)).

2.5.2 Traffic Management Plan Development

The Prime Contractor shall develop the Traffic Management Plan in accordance with [Section 3: Traffic Management Plans](#), which provides detailed requirements for Category 1, 2, and 3 Traffic Management Plans.

The Traffic Management Plan shall include all requirements set out by the Road Authority.

2.5.3 Road Authority Acceptance

No work may be performed on the roadway unless the Prime Contractor's Traffic Management Plan meets the Road Authority's requirements and has been reviewed and accepted by the Road Authority.

The process of documenting and accepting the Traffic Management Plan generally follows:

- The Prime Contractor designates a qualified Traffic Control Manager or Engineer for the project and that person designs and approves the Traffic Management Plan for the Prime Contractor.
- The Road Authority reviews the Prime Contractor's Traffic Management Plan. If it is acceptable, authorization is granted to proceed with the work. Authorization does not constitute formal approval of the details in the Traffic Management Plan. The Traffic Management Plan is reviewed for completeness but the Prime Contractor is responsible for the content.
- If the Road Authority has concerns about the Traffic Management Plan, it may be returned to the Prime Contractor for amendment and re-submission.

For Ministry projects, all plans requiring Ministry acceptance shall be submitted to the Ministry Representative, who provides them to the District Manager, Transportation or designate. Before submitting a Traffic Management Plan to the Ministry, the Prime Contractor shall receive stakeholder approval, including municipalities and/or regional districts, for the impact of the work.

For non-Ministry projects that require access to a Ministry right-of-way, notification shall be provided directly to the District Manager, Transportation or designate.

2.5.4 Compliance

The Prime Contractor shall perform all works in compliance with the Ministry-accepted Traffic Management Plan for the project.

The Traffic Control Plan component of the Traffic Management Plan shall comply with the requirements of Part 18 of WorkSafeBC's Occupational Health and Safety Regulation.

2.5.5 Traffic Management Plan Documentation

Traffic management documentation is the responsibility of the Prime Contractor. The documentation process includes, but is not limited to:

- amending the Traffic Management Plan as the site requires
- keeping a record of all temporary traffic control devices used on the project
- recording the daily status of temporary traffic control devices and times of device changes
- recording the status of temporary traffic control devices as soon as practicable after any incident (including motor vehicle), taking appropriate measurements and photographs, and marking them with the date and time

2.5.6 Traffic Management Plan Resubmission

The Prime Contractor shall amend and re-submit the Traffic Management Plan to the Ministry for review and acceptance whenever:

- a change to work activities alters traffic management requirements
- a change to the scheduling of work activities is proposed
- a change to the traffic management plan is proposed

If a Traffic Management Plan is signed and sealed by a Traffic Engineer, any changes that significantly impact the planned Traffic Operations should be relayed to the Traffic Engineer

2.6 Quality Management

2.6.1 Quality Control

Quality Control (QC) is the responsibility of the **Prime Contractor**. It is documented in the Prime Contractor's Quality Control Plan.

It is an inspection process that examines the quality and effectiveness of the temporary traffic control.

2.6.2 Quality Assurance

Quality Assurance (QA) is the responsibility of the **Road Authority**.

QA is a process which ensures the Prime Contractor is following their Quality Control Plan.

It includes reviewing the Prime Contractor's Traffic Management Plan prior to the commencement of road works and conducting periodic reviews of traffic control as work progresses.

The Road Authority's QA process includes:

- **verifying** Traffic Management Plans to ensure they meet regulatory, contractual, and project-specific requirements
- **reviewing** Traffic Control Plans for overall effectiveness through the work zone.
- **recording** deficiencies and presenting them to the Prime Contractor for review and correction

2.6.3 Traffic Management Audits

Traffic Management Plan and Traffic Control Plan audits are typically conducted by the Road Authority (or those under contract to do so) when reviewing the documentation and field layout of the Prime Contractor. They may also be used by Road Authorities or Prime Contractors to assist in developing Traffic Management Plans.

[Section 3.7 Auditing Traffic Management Plans](#) details the two audit forms found in [Appendix D](#):

- [Traffic Management Plan Documentation Audit Form](#)
- [Traffic Management Plan Field Audit Form](#)

PART A – TRAFFIC MANAGEMENT

Section 3: Traffic Management Plans

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PART A – TRAFFIC MANAGEMENT

Section 3: Traffic Management Plans

3.1 Introduction

Traffic Management Plan	The Prime Contractor's project-specific plan that details the strategies for protecting workers and safely and efficiently moving road users through the work zone, including any requirements of the Road Authority.
--------------------------------	---

The Traffic Management Plan is developed by first assigning a Project Category (Category 1, 2, or 3). The Project Category determines the extent of information required in the Traffic Management Plan and sub-plans. The Traffic Management Plan is then written based on these requirements.

The Traffic Management Plan includes up to four sub-plans:

- Traffic Control Plan¹
- Incident Management Plan
- Public Information Plan
- Implementation Plan

The Traffic Management Plan combines these sub-plans into a single document that demonstrates a full understanding of the site-specific issues and project requirements.

It should also contain provisions for updating the Traffic Management Plan and sub-plans throughout the project to address issues as they arise.

Additional documents may be referred to when developing a Traffic Management Plan:

- [Appendix C: Templates for Traffic Management Plans](#)
- [Appendix D: Traffic Management Plan Audit Forms](#)

¹ A Traffic Control Plan is required for all planned work on Provincial roadways.

3.2 Traffic Management Sub-Plans

3.2.1 Traffic Control Plan

The Traffic Control plan outlines the temporary traffic control devices used to protect workers and move road users safely through the work zone. A Traffic Control Plan is required for all planned work on or near Provincial roadways.

Traffic Control Plans range in scope from being very detailed to simply using typical drawings contained in this Manual. The degree of detail in the Traffic Control Plan depends entirely on the complexity of the work and road environment.

For longer-term projects, multiple traffic control plans may be required as the work progresses. These plans shall be approved by the Prime Contractor and presented for acceptance by the Road Authority.

A Traffic Control Plan outlines the specific traffic control devices that will be used on the project, how they will be implemented, and on what schedule. It does this by using a combination of:

- **text descriptions** of the location of the work zone, proposed work activities, proposed traffic control measures, and the specific times and dates when work will be undertaken.
- **customized traffic control layouts** are sketches of the traffic control layouts found in this manual and modified to suit site specific requirements.
- **customized drawings** (scale drawings) show all existing roadway geometry and features as well as all temporary traffic control devices and layouts.

3.2.2 Incident Management Plan

An Incident Management Plan identifies the Prime Contractor's procedures for responding to unplanned events or incidents. An incident includes events which affect Traffic Operations for workers and/or the travelling public, such as a collision which occurs within the construction zone or unexpected adverse weather conditions.

The Incident Management Plan should define a process of regular review and analysis for identifying actions that will reduce the frequency and severity of incidents.

It is important to respond appropriately to an individual incident, identify actions for reducing the occurrence of incidents, and minimize their impact on workers and traffic.

The **Incident Management Plan** includes procedures for:

- identifying and verifying that an incident has occurred
- quickly responding to an incident to ensure worker and public safety
- contacting appropriate emergency response agencies and Road Authority personnel
- ensuring that emergency responders are assisted by project staff
- quickly assessing an incident's impact on traffic operations and identifying the appropriate response measures

- routing traffic away from the incident by means such as using a diversion or detour around the work site
- ensuring that the Road Authority is updated regarding worker and public safety, traffic conditions, and actions taken to normalize traffic flow
- ensuring that travellers within the traffic queue are made aware of the event(s), their options, and estimated time of opening
- ensuring that any health or safety issues from workers or travellers in the traffic queue that may arise can be attended to
- taking action to restore normal traffic operations by modifying work plans and activities where necessary
- reviewing and analyzing incidents if they occur to identify causes and preventative actions, if any
- recording incident details and reporting them to the Road Authority

It shall also address the potential requirement for **emergency vehicles** to pass through the work zone, and processes for ensuring that:

- Emergency services will be contacted and advised of the planned work, potential issues regarding passage through the work zone, and viable alternative routes.
- Work operations will be stopped and the work zone cleared to allow emergency responders to pass queued traffic and move unimpeded through the work zone.
- Emergency responders in personal vehicles will be able to pass through the work zone safely and expediently.

3.2.3 Public Information Plan

A Prime Contractor's Public Information Plan identifies actions and procedures for informing the travelling public, project stakeholders, and the Road Authority of current traffic operations and planned changes. The significance of the work should dictate the degree of public communication and advance notice required.

The Public Information Plan should ensure that:

- communication issues are identified
- stakeholders are aware of the project and its impacts
- groups directly impacted by specific projects (local residents, businesses, etc.) are appropriately informed
- emergency response agencies and the travelling public are informed in a timely manner regarding work

3.2.4 Implementation Plan

An Implementation Plan identifies responsibilities and procedures for ensuring the other Traffic Management sub-plans are developed and implemented in a coordinated manner.

It also identifies the qualifications, responsibilities, and duties of the supervisory and management personnel who will implement the Traffic Management Plan, including the Traffic Control Manager and the Traffic Control Supervisor.

3.3 Project Category Determination

A structured process is used to determine the Project Category.

1. **Initial Category Assessment** Assess the roadway and traffic features.
2. **Risk Analysis** Identify the project-specific risks.
3. **Final Category Determination** Combine the initial project assessment with the risk analysis to determine the final project category.

Project Categories are defined as:

- **Category 1** - minimal impact on the travelling public, are typically located on simple terrain, and involve two-lane highways or roads, often with lower speeds and traffic volumes.
- **Category 2** - may be located on higher-speed or higher-volume corridors and involve some complexity. Impacts on the travelling public may be moderate because of the roadway characteristics or the type of work.
- **Category 3** - complex and have a significant impact on the travelling public because of factors such as higher volumes and speeds, project duration, active night work, mountainous terrain, and/or a requirement for lane closures and/or detours.

3.3.1 Initial Project Category Assessment

The initial project category assessment considers road and traffic characteristics, as well as specific work activities.

[Table 3.1: Initial Project Category Assessment](#) on the following pages is used to determine the initial project category.

The total point value calculated at the end of Table 3.1 indicates that the project is initially assessed as a Category 1, 2, or 3.

Table 3.1: Initial Project Category Assessment

Traffic Consideration	Value	Point Value	Score
Posted or Statutory Speed Regular posted speed limit of the roadway	≤ 50 km/hr	1 point	
	60 - 70 km/hr	3 points	
	≥ 80 km/hr	4 points	
Traffic Volume Traffic volume (both directions) in peak hours	< 1,000 vehicles/hr	1 point	
	1,000 to 3,000 vehicles/hr	3 points	
	> 3,000 vehicles/hr	4 points	
Lanes Number of lanes in both directions (including auxiliary lanes)	2 lanes	0 point	
	3 lanes	2 points	
	4 lanes or more	3 points	
Encroachment Location of work	Off roadway	0 point	
	Shoulder work/partial lane closure	3 points	
	Full lane closure, ramp closure, or intersection closure	4 points	
Detours	No detour during construction	0 point	
	Detour traffic on temporary roadway during construction next to work zone.	3 points	
	Detour route during construction takes traffic off regular route away from work zone; requires detour signing	4 points	
Duration of Work	Short-duration work (no more than one day-time shift).	1 point	
	Long-duration work (less than 2 weeks)	2 points	
	Long-duration work (2 or more weeks)	4 points	
Allowable Delays Delay time plus time to travel through work zone in minutes	< 20 minutes	1 point	
	≥ 20 minutes	3 points	
	No allowable delay	4 points	

Traffic Consideration	Value	Point Value	Score
Time of Day Time of day that work will occur	Day-time only work	1 point	
	Active day-time work, with traffic control devices in place at night	3 points	
	Active night-time work	4 points	
Vertical Alignment	Flat terrain	0 point	
	Rolling terrain	1 point	
	Mountainous terrain	2 points	
Horizontal Alignment	Tangent	0 point	
	Horizontal curves, no curve advisory speeds	1 point	
	Horizontal curves, with curve advisory speeds	2 points	
Intersections	No intersections or stop-controlled intersection(s)	0 point	
	Signalized intersection(s) with no left or right turn phases, or single lane roundabout	2 points	
	Signalized intersection(s) with left or right turn phase(s), or multi-lane roundabout	4 points	
	Interchange(s)	5 points	
Runaway Lanes	No runaway lanes	0 point	
	Runaway lanes in or near the work zone; they will not be blocked at any time during course of work	1 point	
	Runaway lanes in or near work zone; they may be blocked by work or queues during course of work	4 points	
Pedestrians and Cyclists	No pedestrians or cyclists	0 point	
	Possible pedestrians and cyclists	2 points	
	Designated cycle route, sidewalk or multi-use pathway	3 points	

Traffic Consideration	Value	Point Value	Score
HOV or Bus Lane	No HOV or bus lane	0 point	
	HOV or bus lane	4 points	
Counter-Flow Lane	No counter-flow lane	0 point	
	Counter-flow lane	4 points	
		Total Score	
		Category 1	< 16
		Category 2	16 to 25
		Category 3	> 25
		Initial Project Category	

3.3.2 Project Risk Analysis

A project risk analysis is the process of reviewing site-specific characteristics and considering the likelihood and consequence of each item listed. It is able to highlight potential hazards that are not captured in the Initial Project Category Assessment.

Each project has a unique combination of site-specific characteristics, and the risk analysis considers potential hazards associated with the specific project and/or location.

Table 3.2: Project Risk Analysis on the following pages is used to determine whether each potential hazard creates a low, medium, or high risk for the project and location.

The total point value calculated at the end of Table 3.2 indicates that the project is assessed as a low-risk, medium-risk, or high-risk project.

Combining the results of the initial project category assessment and the risk analysis will determine the final project category (see [Section 3.3.3: Final Project Category Determination](#)).

Table 3.2: Project Risk Analysis

The Project Risk Analysis is a general guideline, applicable to most projects. If significant project-specific hazards are not included in the risk analysis below, the Evaluator may consider increasing the final risk rating. This modification and the justification for it should be documented.

All high-risk, project-specific hazards should be addressed and mitigated in the Traffic Management Plan.

Item	Risk	Definition	Point Value	Score
Falling object	Low	Potential of falling object through course of work (i.e., overhead works, slung loads, or equipment boom/bucket work)	1 point	
	Medium	Working within a known avalanche or rock fall area; no recent evidence of activity	2 points	
	High	Recent evidence of rock or material entering work site or overhead work that may impact travelling public or worker safety (i.e., overhead structures) Vehicle queues may back into a rock fall or avalanche area	3 points	
Nature of work activity	Low	Work activity is not expected to create a significant hazard	1 point	
	Medium	Work activity will create excessive dirt, dust, or gravel on the road surface, and will thereby create a potential hazard	2 points	
	High	Work activity such as blasting, scaling, or excavation < 2 metres from active travelling lanes will create a potential hazard	3 points	
Removal of safety devices	Low	No removal of safety devices	1 point	
	Medium	Removal of safety devices such as pavement markings, signage, traffic signal, or reflectors	2 points	
	High	Removal of containment devices, such as barrier, guard rail, crash attenuators, fencing, etc.	3 points	
Equipment movement through work zone	Low	Minimal conflict with traffic (e.g., work commencing off travelled roadway)	1 point	
	Medium	Conflict with normal traffic flow; no queuing or traffic stoppages	2 points	
	High	Conflicts with normal traffic; may create queuing and require traffic stoppages. Difficult for equipment to enter and exit site	3 points	

Item	Risk	Definition	Point Value	Score
Roadway surface condition during construction	Low	Roadway surface is maintained	1 point	
	Medium	Roadway surface, such as milling and grinding (consistent surface), creates a hazard for road users	2 points	
	High	Roadway surface is inconsistent, with multiple changes or work tasks (manholes, culvert installation, etc.)	3 points	
Storage of equipment and material	Low	Stored outside the shoulder	1 point	
	Medium	Stored on the shoulder but outside travelled roadway	2 points	
	High	Stored on shoulder but encroaching on travelled roadway	3 points	
Load restrictions as a result of construction	Low	No load restrictions	1 point	
	Medium	Narrow lanes restrict wide loads	2 points	
	High	Overweight/overheight vehicles restricted (may result in structural damage)	3 points	
Lane widths	Low	Maintain existing lane widths	1 point	
	Medium	n/a	n/a	
	High	Lane width not maintained throughout work zone, or Single-lane alternating traffic	3 points	
Work zone or queues block access (active or inactive site)	Low	None	1 point	
	Medium	Side street or business access	2 points	
	High	Major public facility and/or major secondary roadway	3 points	
Transit access	Low	No transit or school bus stops	1 point	
	Medium	Community shuttle or school bus stops	2 points	
	High	Express transit or major bus route	3 points	
Impacts of special events	Low	No known event	1 point	
	Medium	Moderate public event with attendance under 5,000	2 points	
	High	Major public event with attendance over 5,000 or moderate public event (under 5,000) with no alternative access or route	3 points	

Item	Risk	Definition	Point Value	Score
Overlapping work	Low	No overlapping work	1 point	
	Medium	Another work site within 3 km; traffic control for the projects could impact one another	2 points	
	High	Work sites adjacent or overlapping	3 points	
Emergency facility (ie. hospital, police, ambulance, and fire stations)	Low	No emergency facility near work site	1 point	
	Medium	24-hour manned emergency facility	2 points	
	High	Volunteer-staffed emergency facility; consider responder access through work zone to the facility, and emergency response from facility through the work zone	3 points	
Total Score				
Low Risk				< 23
Medium Risk				23 to 28
High Risk				> 28
Project Risk				

3.3.3 Final Project Category Determination

The matrix in [Table 3.3: Final Project Category Determination](#) should be used to make the final project category determination.

It combines the initial project category assessment with the results of the risk analysis to identify a final project category based on roadway and traffic characteristics and risks.

It may be appropriate to increase the final category level for high-risk projects to reflect the complexity or hazards associated with the work.

Table 3.3: Final Project Category Determination

		Initial Project Category Assessment		
		1	2	3
Project Risk	Low	Category 1	Category 2	Category 3
	Medium	Category 1	Category 2	Category 3
	High	Category 2	Category 3	Category 3

The final project category determination should be used to identify required and recommended sub-plans and special conditions addressed in the Traffic Management Plan.

This process is a guide and may not capture all components of the project which should be considered when determining the Project Category.

3.4 Traffic Management Plan Requirements by Category

See also Appendix C: Templates for Traffic Management Plans.

3.4.1 Category 1 Traffic Management Plan Requirements

Category 1 Traffic Management Plans are typically appropriate for projects on two-lane highways or roads that have minimal impact on the travelling public.

The Prime Contractor shall provide all updates of the Traffic Management Plan to the Road Authority's project representative for review and acceptance.

Category 1 Traffic Management Plans include:

- Road Authority contact information
- Description of work activity:
 - type and hours of work
 - location and size of work zone
 - lanes affected by the works, and lane configuration in work zone
 - maximum proposed delays or closure times
- Description of site factors, hazards, and the impacts of work:
 - accesses and/or intersections that will be affected by the work zone or by traffic control devices
 - mitigation measures to be implemented for the identified site factors, hazards, and impacts of the work

- Note:**
1. Additional documentation may be required by the Road Authority.
 2. If the Traffic Management Plan uses the Template for Category 1 Traffic Management Plan provided in [Appendix C: Templates for Traffic Management Plans](#), daily updates will be required using the Daily Sign Check Form that is also provided in [Appendix C](#).

Category 1 Traffic Control Plan

A Traffic Control Plan is required for Category 1 projects. It outlines the methods and procedures for managing traffic, including:

- speed limits
- device placement and maintenance
- traffic control layouts for the work zone (for reference, see layouts in Sections 7 to 19)

Category 1 **traffic control layouts** shall:

- reference typical layouts (Sections 7 to 19) selected for the site
- include a North Arrow
- be modified for site specific consideration

Category 1 Incident Management Plan

An Incident Management plan is required when:

- the Road Authority identifies hazards within the work zone that may impact the travelling public
- special work zone accommodation is required for emergency vehicles

An Incident Management Plan is recommended when:

- hazards or risks may impact the work area and require mitigation or consideration in the Traffic Management Plan
- work zones are more than 100 metres long and the travel lanes are restricted in width
- the project requires a total road closure for any duration

Category 1 Incident Management Plans includes:

- a contact list for emergency response agencies and key stakeholders
- procedures for emergency vehicles to pass through the work site
- any additional information required by the Road Authority

Category 1 Public Information Plan

A Public Information Plan is recommended when:

- the highway will be closed for more than 10 minutes
- the project is on a two-lane roadway where traffic volumes in the affected direction exceed 500 vehicles per hour

The Prime Contractor's Public Information Plan should include:

- methods for communicating to the travelling public and the Road Authority
- appropriate, site-specific work information signs, as required
- methods for providing work updates to the Road Authority
- dynamic message sign (DMS) messaging (message and phases), if used
- any additional information required by the Road Authority

Category 1 Implementation Plan

An Implementation Plan is required when an Incident Management Plan is used.

Category 1 Implementation Plans should identify:

- names of persons responsible for overseeing implementation of the Traffic Management Plan:
 - Site Supervisor
 - Traffic Control Supervisor if known (otherwise name to be recorded on Daily Traffic Control Log)
 - Traffic Control Persons if known (otherwise name to be recorded on Daily Traffic Control Log)
- any additional information that may be required by the Road Authority

3.4.2 Category 2 Traffic Management Plan Requirements

Category 2 Traffic Management Plans are typically required for projects that may be located on higher-speed or higher-volume corridors. Impacts on the travelling public may be higher because of the roadway characteristics or the type of work to be done.

For all projects on freeways, expressways, or roads where the regular posted speed limit is 70 km/h or above, there may be a requirement to have the Traffic Management Plan prepared under the direction of a Professional Engineer who is licensed in British Columbia and qualified and experienced in traffic management planning and highway safety.

The Prime Contractor shall provide all updates of the Traffic Management Plan to the Road Authority's project representative for review and acceptance.

Category 2 Traffic Management Plans include:

- Road Authority contact information
- Description of project area:
 - classification of roadway, number of lanes (undivided, expressway, etc.)
 - regular posted speed limit
 - road alignment
- Description of work activity:
 - type and hours of work
 - location and size of work zone
 - lanes affected by the works, and lane configuration in work zone
 - maximum proposed delays or closure times
- Description of site factors, hazards and impacts:
 - location, nature, and impacts of hazardous areas
 - accesses and/or intersections that will be affected by the work zone or by traffic control devices
 - deviations in traffic patterns and/or traffic behaviors
 - geometric roadway conditions (horizontal and vertical roadway geometry)
 - anticipated weather conditions
 - any other relevant risk factors

Category 2 Traffic Control Plan

A Traffic Control Plan is required for Category 2 projects.

It outlines the methods and procedures for managing traffic, and shall include:

- Customized Traffic Control Layouts
- work zone location using landmarks and Landmark Kilometre Inventory (LKI) where applicable
- accesses and/or intersections affected by the work zone or by traffic control devices
- speed limit(s) throughout the work zone
- device placement and maintenance
- mitigation measures for any identified hazards or potential risks
- site-specific, customized traffic control layouts for the work zone (for reference, see layouts in Sections 7 to 19):
 - during active work and as activity changes
 - during periods of inactivity
- detour routes, if available, considering:
 - all local roads to be used as detour routes, and the design speed and design vehicle for each road to be used as a detour route
 - traffic control changes necessitated by the detour route, such as temporary signals or signal timing changes
- provisions to maintain continuous, clear and safe passage for all road users and traffic during all phases of the work

Customized Traffic Control Layouts shall:

- be specific to the site
- include a North Arrow
- show schematically the placement of all traffic control devices in accordance with the standards in this Manual
- use standard symbol conventions for identifying traffic control devices (see layouts throughout the Manual and Legend on first pages of Sections 7 to 19)
- provide work zone/roadway dimensions and explanatory notes on the layouts
- label all signs on the layouts with one of the following:
 - sign number with description
 - sign number with graphical representation
 - sign number and legend
- show all sign spacing, taper lengths, offsets, etc.
- place layouts on project drawings if these are available

Category 2 Incident Management Plan

An Incident Management plan is required when:

- the Road Authority identifies hazards within the work area that may impact the travelling public
- special work zone accommodation is required for emergency vehicles

An Incident Management Plan is recommended when:

- hazards or risks may impact the work area and require mitigation or consideration in the Traffic Management Plan
- work zones are more than 100 metres long and the travel lanes are restricted in width
- the project requires a total road closure for any duration

Category 2 Incident Management Plans shall include:

- contact list for emergency response agencies and key stakeholders
- duties and responsibilities of Traffic Control Supervisor with respect to incident response operations
- types of incidents that could occur in the work zone
- procedures for responding to incidents that occur within the work zone
- procedures for accommodating emergency volunteers on emergency call-out who are travelling through the work zone in personal vehicles
- procedures for emergency vehicles to pass through the work zone
- procedures for informing and updating the Road Authority regarding:
 - incident occurrence
 - response measures taken
 - clearance measures required
 - estimated clearance time
 - resumption of pre-incident operations
- procedures for advising the travelling public of estimated clearance time and any available alternative routes
- procedures for recording incident details and reporting them to the Road Authority within 24 hours
- any additional information required by the Road Authority

Category 2 Public Information Plan

A Public Information Plan is required when:

- the highway will be closed for more than 10 minutes
- the project is on a two-lane roadway where traffic volumes in the affected direction exceed 500 vehicles per hour

A Public Information Plan is recommended when:

- for lane closures on a three- or four-lane roadway: traffic volumes in the affected direction will exceed 1,200 vehicles per hour at any time during the closure periods
- for lane closures on a six-lane roadway: traffic volumes in the affected direction will exceed 2,400 vehicles per hour at any time during the closure periods

The Prime Contractor's Public Information Plan shall include:

- Road Authority contact information
- contact numbers for stakeholders and major user groups
- methods for providing work updates to the Road Authority
- methods and procedures for communicating to the travelling public [e.g., internet, radio, print media, flyer, dynamic message signs (DMS), etc.]
- appropriate, site-specific work information signs, as required
- a process for notifying the travelling public of unscheduled traffic delays
- a process for notifying the travelling public of scheduled traffic delays and project duration at least one week before the work starts or when major changes are made to existing processes
- a process for ensuring that major user groups, emergency response agencies, transportation companies, and the travelling public are aware of the schedule of road closures or alternating lane closures at least two weeks before the work starts or as major changes occur
- a process for notifying road users of traffic pattern changes or road conditions as the work progresses and major changes occur
- methods that will be used to communicate with stakeholders and the public, including a list of DMS messages and phases (if used)
- any additional information required by the Road Authority

Category 2 Implementation Plan

An Implementation Plan is required for Category 2 projects.

Category 2 Implementation Plans should identify the individuals responsible for overseeing the implementation of the Traffic Management Plan in accordance with the duties outlined in [Section 1.2.3: Traffic Control Responsibilities](#) and [Section 5: Traffic Control Persons:](#)

- Site Supervisor – identify name and duties
- Traffic Control Manager – identify name and duties
- Traffic Control Supervisor – identify duties (name to be recorded on Daily Traffic Control Log)
- Traffic Control Persons – identify duties (name to be recorded on Daily Traffic Control Log)
- Traffic Engineer (if required) – identify name and duties
- any additional information required by the Road Authority

3.4.3 Category 3 Traffic Management Plan Requirements

Category 3 Traffic Management Plans are complex because they manage significant impacts to the travelling public as a result of higher volumes and speeds, project duration, active night work, mountainous terrain, and/or a requirement for lane closures and/or detours.

A Category 3 Traffic Management Plan shall be signed and sealed by a Professional Engineer who is licensed in British Columbia and qualified and experienced in traffic management planning and highway safety. The Professional Engineer is responsible for approving, and sealing the Traffic Management Plan and Traffic Control Plans, including all drawings and layouts.

The Prime Contractor shall provide all updates of the Traffic Management Plan to the Road Authority's project representative for review and acceptance.

Category 3 Traffic Management Plans include:

- Road Authority contact information
- Description of project area:
 - classification of roadway, number of lanes (undivided, expressway, etc.)
 - regular posted speed limit
 - road alignment
 - road volumes
- Description of work activity:
 - type and hours of work
 - location and size of work zone
 - lanes affected by the works, and lane configuration in work zone
 - maximum proposed delays or closure times
- Description of site factors, hazards, and impacts:
 - location, nature, and impacts of hazardous areas
 - accesses and/or intersections that will be affected by the work zone or by traffic control devices
 - deviations in traffic patterns and/or traffic behaviors
 - geometric roadway conditions (horizontal and vertical roadway geometry)
 - anticipated weather conditions
 - any other relevant risk factors

Category 3 Traffic Control Plan

A Traffic Control Plan is required for Category 3 projects.

It outlines the methods and procedures for managing traffic, and shall include:

- Customized Drawings
- hours of work
- work zone location and direction, and distance to nearest landmarks
- lanes affected by the works
- lane configuration in work zone
- accesses and/or intersections that will be affected by the work zone or by traffic control devices
- device placement and maintenance
- mitigation measures for identified hazards or potential risks
- traffic volume capacity during project
- proposed delays or closure times
- proposed traffic control including site-specific, customized traffic control layouts for the work zone (for reference, see layouts in Sections 7 to 19):
 - during active work and as activity changes
 - during periods of inactivity
- traffic signal timing changes necessitated by the detour route or project works
- detour routes, if available, considering:
 - all local roads to be used as detour routes, and the design speed and design vehicle for each road to be used as a detour route
 - traffic control changes necessitated by the detour route, such as temporary signals or signal timing changes
- provisions to maintain continuous, clear and safe passage for all road users and traffic during all phases of the work

Customized Drawings shall show:

- a North Arrow
- work zone location using landmarks and Landmark Kilometre Inventory (LKI) where applicable
- accesses and/or intersections affected by work zone or traffic control devices
- travel lanes affected
- resultant lane configuration, including widths
- location of restricted-width lanes
- speed limit(s) throughout the work zone
- location of hazardous areas created by road geometry or local location of vehicle storage areas if delays are anticipated
- any local roads to be used for detour routes, and the design speed and design vehicle for each road to be used as a detour route

- traffic signal location changes necessitated by the detour route or project works
- traffic control layouts showing the placement of all traffic control devices and Traffic Control Persons in accordance with the standards in this Manual
- use standard symbol conventions for identifying traffic control devices (see layouts throughout the Manual and Legend on first pages of Sections 7 to 19)
- dimensions and explanatory notes on the drawings including sign spacing, taper lengths, offsets, etc.
- traffic operations at all phases of the project
- signs labelled on the layouts with one of the following:
 - sign number with description
 - sign number with graphical representation
 - sign number and legend

Category 3 Incident Management Plan

An Incident Management Plan is required for Category 3 projects.

Category 3 Incident Management Plans shall identify:

- contact list for emergency response agencies and key stakeholders (may be a separate page or document)
- name of Traffic Control Supervisor, and duties and responsibilities with respect to incident response operations
- name of Traffic Control Manager, and duties and responsibilities with respect to incident management
- types of incidents that could occur in the work zone
- procedures for detecting and verifying incidents that occur in the work zone
- procedures for responding to incidents that occur within the work zone
- procedures for accommodating emergency volunteers on emergency call-out who are travelling through the work zone in personal vehicles
- procedures for emergency vehicles to pass through the work zone
- procedures for informing and updating the Road Authority regarding:
 - incident occurrence
 - response measures taken
 - clearance measures required
 - estimated clearance time
 - resumption of pre-incident operations
- procedures for advising the travelling public of estimated clearance time and any available alternative routes
- procedures for recording incident details and reporting them to the Road Authority within 24 hours
- procedures for restoring traffic flow around an incident site as quickly as possible
- procedures for clearing the incident and restoring normal project traffic operations as soon as possible
- process for reviewing incidents and proposing modifications to the project that will reduce severity and frequency of incidents
- any additional information required by the Road Authority

Category 3 Public Information Plan

A Public Information Plan is required for Category 3 projects.

The Prime Contractor's Public Information Plan should include:

- Road Authority contact information
- contact numbers for stakeholders and major user groups
- methods for providing work updates to the Road Authority
- methods and procedures for communicating to the travelling public [e.g., internet, radio, print media, flyer, dynamic message signs (DMS), etc.]
- appropriate, site-specific work information signs, as required
- a process for notifying the travelling public of scheduled traffic delays and project duration at least one week before the work starts or when major changes are made to existing processes
- a process for ensuring that major user groups, emergency response agencies, transportation companies, and the travelling public are aware of the schedule of road closures or alternating lane closures at least two weeks before the work starts or as major changes occur
- a process for notifying road users of traffic pattern changes or road conditions as the work progresses and major changes occur
- a process for notifying the travelling public of unanticipated traffic delays
- a list of DMS messages and phases to be used
- any additional information required by the Road Authority

Category 3 Implementation Plan

An Implementation Plan is required for Category 3 projects.

Category 3 Implementation Plans should identify the individuals responsible for overseeing the implementation of the Traffic Management Plan in accordance with the duties outlined in [Section 1.2.3: Traffic Control Responsibilities](#) and [Section 5: Traffic Control Persons](#):

- Traffic Engineer – identify name and duties
- Site Supervisor – identify name and duties
- Traffic Control Manager – identify name and duties
- Traffic Control Supervisor – identify duties (name to be recorded on Daily Traffic Control Log)
- Traffic Control Persons – identify duties (name to be recorded on Daily Traffic Control Log)
- any additional information required by the Road Authority

3.5 Traffic Management Plan Process Summary

Process for Developing Traffic Management Plans for Ministry Projects

- Step 1** Gather project information.
- Step 2** Complete **Initial Category Assessment** using Table 3.1 in [Section 3.3.1: Initial Project Category Assessment](#).
- Step 3** Complete **Risk Analysis** using Table 3.2 in [Section 3.3.2: Project Risk Analysis](#).
- Step 4** Make **Final Category Determination** using Table 3.3 in [Section 3.3.3: Final Project Category Determination](#).
This involves adjusting the initial category on the basis of the risk analysis outcome to determine the final category for the project.
- Step 5** Develop the **Traffic Management Plan**:
- Include sub-plans required for the project category.
 - Ensure that the Plan includes measures for mitigating all risks identified in the Road Authority's traffic management requirements and in Step 3 above.
 - Consider using the appropriate template in [Appendix C: Templates for Traffic Management Plans](#) and the audit forms in [Appendix D: Traffic Management Plan Audit Forms](#) as guidance in developing the Plan.
- Step 6** Submit the proposed Traffic Management Plan for review. See [Figure 2.2: Traffic Management Process Life Cycle](#) for the Ministry's Traffic Management Plan acceptance process.
- Step 7** Begin work only after the Traffic Management Plan has been accepted and the Ministry has issued authorization for the work to proceed.

3.6 Potential for Traffic Incident Litigation

The objective of road authorities, contractors and utilities should be to avoid traffic incidents in work zones. The following will help to accomplish this objective:

- Know and comply with safe and effective principles of traffic control.
- Ensure that the proper devices are in place in the work zone; including times when the zone is unattended at night, weekends, holidays, etc.
- Follow all safety regulations.
- Document all actions taken on or related to traffic control placed in the work zone.
- Inspect the work zone with a view for detecting and correcting observed deficiencies in traffic control.
- Remove all material and equipment not needed at the site as soon as possible, including traffic control devices no longer required.
- Provide adequate warning, guidance and protection for motorists, pedestrians, cyclists and workers for and from all foreseeable conflicts and hazards that could result from the work being done.

In spite of the best efforts outlined above, traffic incidents may still occur and some of these may result in lawsuits against the Road Authority. Defense against such lawsuits relies to a considerable degree on records that have been kept of job related activities and of traffic control maintained in the work zone. Documentation of changes made, as and when seen to be needed, should be viewed as indication of an effort always to provide adequate traffic control.

The primary information captured in documentation of changes made include:

- What is the decision?
- When was it made?
- Why was it made?
- Who made it?
- Other information may be included and may vary based on the scope of the change(s).

3.6.1 Analysis of Work Zone Incidents and Near Misses

Work zones should be monitored and inspected regularly to identify and analyze evidence of traffic incidents and conflicts. The process for analyzing work zone incidents and near misses should be explained in the Incident Management Plan, together with the relevant responsibilities of onsite personnel.

Incidents and near misses should be investigated and relevant information recorded, together with details about any subsequent changes made to the traffic control layout (see also [Section 3.6.2: Traffic Control Records](#)). For example, skid marks or devices that have been moved, knocked over, or damaged may indicate that traffic control changes are required. The Road Authority should be notified of all traffic control changes.

It is important to establish and evaluate the communication processes for reporting incidents to the Road Authority, along with response actions taken, and the steps taken to re-establish normal operations and advise the public of travel delays or traffic pattern changes.

Work zone incident reports should be analyzed and recommendations implemented to assist with improving work zone operations. Once the changes are implemented, they should be monitored for effectiveness.

3.6.2 Traffic Control Records

Although record-keeping in the field can be time-consuming, particularly for a moving operation, it is important to record significant traffic control actions taken by field crews. Good traffic control records prove to be particularly critical in cases in which a traffic incident results in litigation.

The traffic control records should include, but not be limited to:

- photo logging
- photographs accompanied by brief descriptions of time, location, direction, and photographer's name
- maintaining up-to-date Traffic Control Plans by recording notes on construction plans or, preferably, updating the Traffic Control Plan
- daily diary entries of times, locations, and names of individuals involved in the installation, change, and removal of traffic control devices

When the traffic control inspection process reveals a condition that requires changes, the documentation should include:

- description and location of the change required, when the requirement was noted, and by whom
- instructions given to make changes
- what changes or replacements were made, and when
- if changes were deferred, why

Additional traffic control documentation may result from the auditing processes outlined in [Section 3.7: Auditing Traffic Management](#) and [Appendix D: Traffic Management Plan Audit Forms](#).

3.7 Auditing Traffic Management Plans

[Appendix D: Traffic Management Plan Audit Forms](#) contains two forms intended for use by Ministry personnel who are auditing Traffic Management Plans:

- Traffic Management Plan Documentation Audit Form
- Traffic Management Plan Field Audit Form

These forms may also serve as a guide for traffic management planning by other Road Authorities, and for Prime Contractors if they wish to use them or are instructed to do so.

3.7.1 Traffic Management Plan Documentation Audit

The procedures for evaluating a proposed Traffic Management Plan should be appropriate to the complexity of the project:

- **Traffic Management Plans for Category 1 projects** may require only the verification of the information against the requirements in [Section 3.4.1: Category 1 Traffic Management Plan Requirements](#).
- **Traffic Management Plans for Category 2 and 3 projects** require more comprehensive evaluations for completeness and suitability.

Each sub-plan should be evaluated for completeness with respect to the requirements (see [Section 3.4.2: Category 2 Traffic Management Plan Requirements](#) and [Section 3.4.3: Category 3 Traffic Management Plan Requirements](#)), and returned to the Prime Contractor for further attention if it is considered incomplete.

Once all sub-plans are complete, the Traffic Management Plan should be evaluated in its entirety to ensure that it meets the Road Authority's stated requirements.

Any items flagged as incomplete should be addressed in writing in the Comments section at the end of the Traffic Management Plan Documentation Audit Form. The completed form should be provided to, and discussed with, the Prime Contractor.

3.7.2 Traffic Management Plan Documentation Audit Process

Ministry personnel should use the Traffic Management Plan Documentation Audit Form in [Appendix D: Traffic Management Plan Audit Forms](#) in conjunction with the evaluation steps outlined below, using a system of check-marks (✓) and X's on the form to indicate compliance and non-compliance, respectively.

Traffic Management Plan Documentation Audit Process	
Step 1	Evaluate completeness of Traffic Management Plan. Ensure that the sub-plans, layouts, and drawings are appropriate for the project category, and that all required information is provided.
Step 2	Evaluate completeness of Traffic Control Plan. Ensure that the proposed traffic control measures are appropriate for the project category, and that the proposed traffic control measures and layouts are suitable for the planned work activities, traffic volumes, route, and time of day.
Step 3	Evaluate completeness of Incident Management Plan. Ensure that all required information is provided.
Step 4	Evaluate completeness of Public Information Plan. Ensure that all required information is provided.
Step 5	Evaluate completeness of Implementation Plan. Ensure that all required information is provided.
Step 6	Accept or reject Traffic Management Plan. If information is missing or any sub-plans are incomplete and do not meet the stated requirements, return the Traffic Management Plan to the Prime Contractor for revision.
Step 7	Document any conditions or limitations before sign-off. Once all of the above requirements have been met, identify any Ministry conditions or limitations before accepting the Traffic Management Plan.
Step 8	Authorize the work.

3.7.3 Traffic Management Plan Field Audit

The field audit is a process of verifying that the work site practices and traffic control layouts for the project comply with the standards specified in this Manual and the Traffic Management Plan. This process is usually conducted on larger projects by the Ministry or a third-party.

Field audits include the following:

- Verify that the traffic control setups are consistent with those identified in the Traffic Management Plan and Traffic Control Plan.
- Verify that the use, positioning, and condition of signs and other traffic control devices are consistent with those identified in the Traffic Management Plan and Traffic Control Plan, and that they are performing effectively for traffic control purposes. If possible, field audits should be conducted during both daytime and night as visibility can differ significantly based on lighting conditions.
- Verify that the safety practices and apparel of Traffic Control Persons and other workers on the work site comply with the standards specified in this Manual for safety and retroreflectivity.

The Traffic Management Plan Field Audit Form in [Appendix D: Traffic Management Plan Audit Forms](#) should be used when conducting a field audit, using a system of check-marks (✓) and X's to indicate compliance and non-compliance, respectively.

Any items flagged as incomplete should be addressed in writing in the Comments section at the end of the Traffic Management Plan Field Audit Form. The completed form should be provided to, and discussed with, the Prime Contractor.

A follow-up audit may be required to confirm that the Prime Contractor has made and documented the appropriate changes.

Once all problems have been corrected, this should also be recorded, and copies of the completed form should be given to the Prime Contractor and placed on the project file.

PART B – TRAFFIC CONTROL

Section 4: Temporary Traffic Control Devices

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PART B – TRAFFIC CONTROL

Section 4: Temporary Traffic Control Devices

4.1 Introduction

Temporary Traffic Control Device

Signs, signals, markings, and other devices used to regulate, warn, and guide road users through or around roadway construction, maintenance, or utility work.

The design and application of temporary traffic control devices in work zones should address the needs of all road users—drivers, cyclists, and pedestrians, including those with disabilities.

The devices should meet the basic principles of signing to be effective with road users:

1. They fulfill a need.
2. They command attention and respect.
3. They convey a clear, simple meaning.
4. They provide adequate time for a proper response.

These Ministry manuals provide additional information on using traffic control devices:

- Electrical and Traffic Engineering Manual, 2019
- Manual of Standard Traffic Signs and Pavement Markings, 2000

4.1.1 Fundamental Principles

1. **Regulatory devices** are those specified by Provincial statute and/or municipal by-law, and are used to require certain actions of drivers, cyclists, and pedestrians.
2. **Consistent sign design** assists in communicating information to drivers and enables road users to recognize and easily understand what is required. Signs should have the same shape, colour, dimensions, messaging, and retroreflectivity as signs of the same type.
3. **Uniformity** means always treating similar situations in the same way. Placing devices in a uniform and consistent manner ensures that road users can respond properly based on their previous exposure to similar traffic control situations.
4. **Sign placement** should ensure visibility and adequate time for road users to respond to the messaging.
5. **Physical maintenance** is required to ensure that devices are visible and legible. Clean and properly mounted devices, in good condition, command the respect of road users.
6. **Functional maintenance** means installing, adjusting, and removing traffic control devices in response to changing roadway conditions. This includes review of the traffic control plan for effectiveness and modification if necessary.

4.1.2 Safety Standards for Temporary Traffic Control Devices

Ministry policy requires that all roadside devices such as traffic barriers, barrier terminals, crash attenuators, bridge railings, sign and light pole supports, and work zone hardware used on Provincial highways meet the current crash-worthy performance criteria specified by the American Association of State Highway and Transportation Officials (AASHTO) [Manual for Assessing Safety Hardware](#) (MASH) unless otherwise specified by the Road Authority.

To determine if a product is MASH approved, the Ministry requires the Eligibility Letter by the Federal Highway Administration (FHWA).

4.1.3 General Requirements for Temporary Traffic Control Devices

- Temporary traffic control devices used for construction, maintenance, utility or incident management operations on a street, highway, or private road open to public travel shall comply with the applicable provisions of this Manual.
- Devices shall be maintained and kept clean, visible, and properly positioned at all times.
- Devices that are excessively worn, bent, or damaged shall be replaced.
- Devices that have lost a significant amount of retroreflectivity shall be replaced.
- Cones shall include retroreflective bands if used at night.
- Any contract provisions regarding temporary traffic control devices shall be implemented as specified.

4.1.4 New and/or Customization of Temporary Traffic Control Devices

The TMM provides an extensive amount of temporary traffic control devices to ensure the safety of both workers and road users within and through work zones. However, on occasion unique operational issues arise where modifications to existing devices, or the use of new devices may be required to address specific issues and/or to provide greater clarity for safe and efficient highway operations. Use of, modification of, or development of temporary traffic control devices not discussed or illustrated in the TMM will need the approval of, or be developed by, the Ministry's [Traffic and Highway Safety Engineering - Policy and Standards](#) section.

4.2 Traffic Signs

This section explains the use of standard traffic signs for construction, maintenance, and utility work. Specific information on the individual signs commonly used in construction and maintenance applications—including sign illustrations and descriptions—is provided in [Appendix B: Standard Construction Signs](#).

4.2.1 General Guidelines for Traffic Signs

- Construction signs are fluorescent orange.
- Other traffic signs may be used within work zones including regulatory, warning, and guide signs. Warning signs within work zones are fluorescent orange.
- Existing signs that do not apply during the work activity shall be covered or removed.
- See [Appendix B: Standard Construction Signs](#) for the most commonly used signs for work zones.

4.2.2 Standard Sign Patterns

The sign illustrations in this Manual are only representations of the true designs, and should not be used as patterns for sign manufacturing.

The Ministry's Catalogue of Standard Traffic Signs provides information regarding the signs used by the Ministry:

<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/traffic-engineering-safety/traffic-signs-markings#catalogue>

4.2.3 Sign Material

1. Rigid Signs

Rigid signs are sufficiently rigid to display the sign information to road users for the duration of work under all road and climatic conditions. They are the most common type of sign on Provincial Highways.

Rigid work zone signs are typically made of aluminum or plywood. They may also be fabricated using alternative substrate material (fiberglass, plastic, composites, etc.), provided that sign performance (visibility, sheeting adhesion) matches that of aluminum or plywood. Traffic control paddles can also use alternative substrates.

2. Roll-Up Signs

Roll-up signs are made from flexible sheeting material that allows them to be rolled-up or folded. They are usually mounted on lightweight supports. The mounting should be such that the sign display is similar to that of a rigid sign.

Any roll-up sign that meets the following criteria is suitable for use on Provincial highways for work not exceeding 48 hours in duration (including overnight).

4.2.4 Retroreflectivity Standards

1. Signs shall show the same colours and shapes by night as by day.
2. Ministry sign and device retroreflectivity shall conform to the current version of: American Society for Testing and Materials (ASTM) D 4956 Standard Specification for Retroreflective Sheeting for Traffic Control.
 - All fluorescent orange signs, barricades, vertical panels, and rigid, flat surfaces shall have retroreflectivity using ASTM Type 9 or better sheeting.
 - All rigid, flat surface signs of other colours shall have retroreflectivity in accordance with the Ministry's Catalogue of Standard Traffic Signs (typically, ASTM Type 3/4 sheeting).
 - All flexible or curved surfaces, such as the surfaces of roll-up signs, drums, or tubular markers, shall have retroreflectivity using ASTM Type 6 or better sheeting material.
3. Signs should be inspected to ensure proper retroreflectivity. This may be done by driving through the work zone at night using only low-beam headlights and assessing the legibility of each sign. The retroreflectivity levels of signs may also be checked using a photometer or reflectometer.

Generally, signs should be replaced when they show a 50% loss of retroreflectivity based on the manufacturer's specification.
4. Work zone signs are subject to severe service conditions and generally have a shorter life expectancy than permanently mounted signs. Signs that are visibly damaged, cracked, glazed, pitted, or otherwise marred to the extent that they are ineffective should be replaced immediately.

4.2.5 Sign Dimensions and Letter Heights

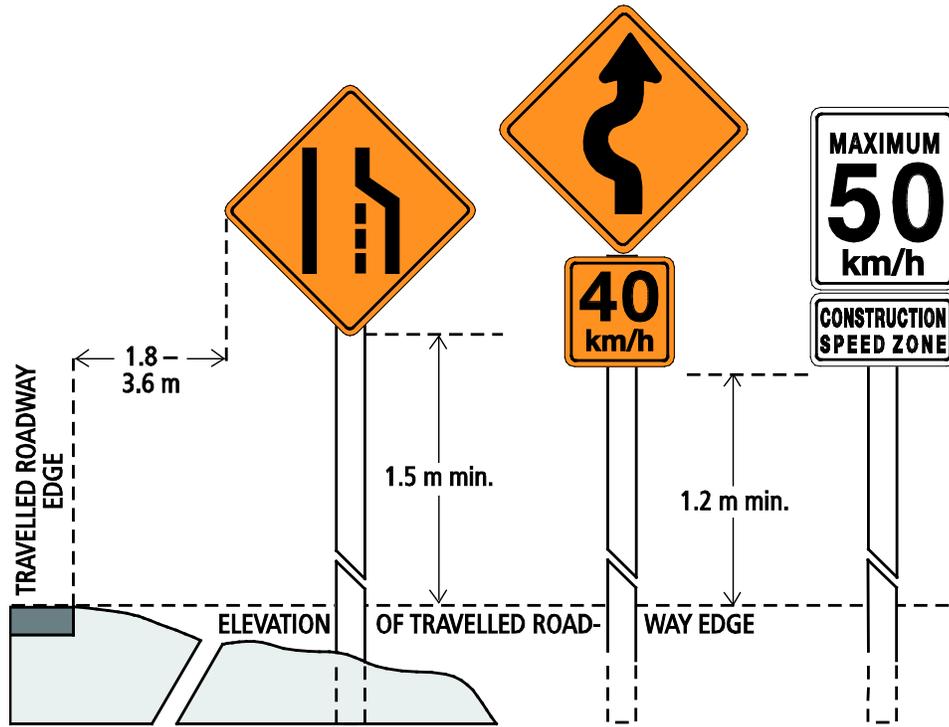
1. The Ministry's [Catalogue of Standard Traffic Signs](#) specifies sign dimensions and letter heights of construction signs.
2. Sign sizes used in work zones should not be smaller than those normally required on the roadway.
3. Sign sizes are related to the roadway type—local road, low-speed road, arterial road, expressway, or freeway. Refer to the Ministry's [Catalogue of Traffic Signs](#) for specific sizes based on the sign and roadway type. Generally:
 - Smaller dimensions apply to urban roadways where the regular posted speed is ≤ 60 km/h.
 - Larger dimensions apply to rural roadways with a regular posted speed limit of ≥ 70 km/h, provided that there is sufficient room to accommodate the larger signs.
 - Multilane divided roadways typically use oversized signs on both the right and the left side of the roadway. Signs erected on the left side may be erected in a closed lane, shoulder, or median. If sufficient width is not available on the left shoulder or median, a smaller sized sign may be used.
4. Custom signs may be required to convey site-specific information. The recommended letter heights shown below should be used when designing these signs.

Table 4.1: Recommended Letter Heights for Custom Construction Signs

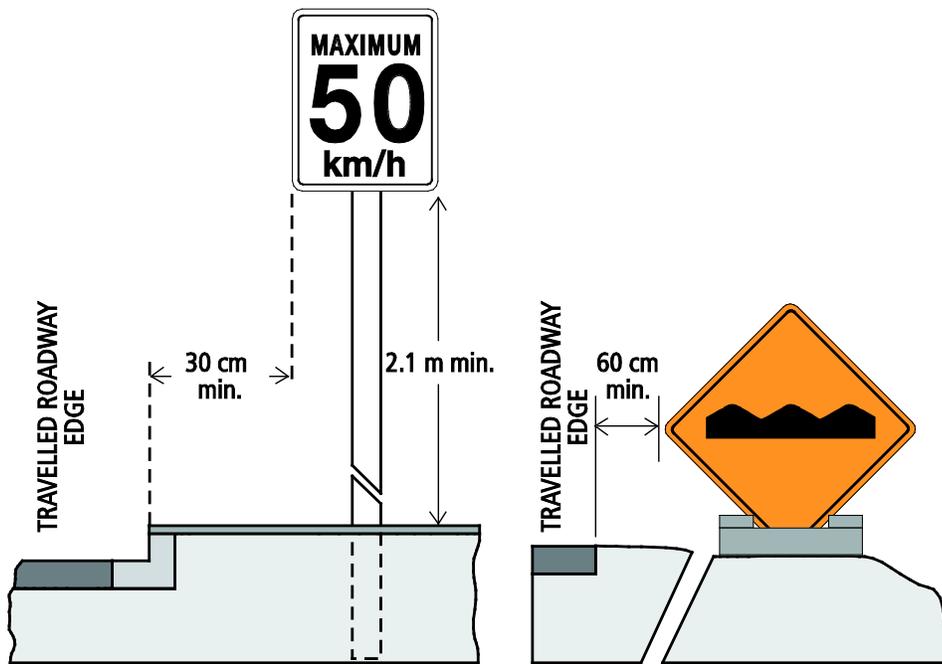
Recommended Letter Heights for Custom Construction Signs	
≤ 50 km/h	150 mm
60 - 90 km/h	200 mm
> 90 km/h	250 mm (minimum) 300 mm (desirable)

4.2.6 Sign Supports

1. Signs may be attached to posts or portable supports. For long-duration projects, signs are typically post-mounted.
2. Temporary STOP and YIELD signs should be mounted at approximately the same height and in approximately the same position as permanent installations.
3. Portable sign supports are more practical for short-duration work and for situations in which signs are repositioned frequently.
4. Sign supports should be lightweight, yielding, or have the same breakaway features as permanent installations.
5. To avoid illegibility resulting from the glare and direct reflection of headlights, signs may be tilted back slightly or rotated a few degrees away from the roadway but the sign message shall remain clearly displayed to drivers.
6. **Post-Mounted Sign Supports:** Minimum mounting heights and lateral offsets for post-mounted signs are shown in [Figure 4.1 A: Typical Sign Installation Heights and Offsets](#).
7. Signs up to 90 cm x 90 cm may be mounted on one post. Larger signs normally require two posts.
8. **Barrier-Mounted Sign Supports (Saddle Brackets):** Signs may be mounted on barrier posts and barrier stands, also known as saddles, which shall be securely bolted to concrete roadside or concrete median barriers, as shown in [Figure 4.1 B: Barrier Mounted Sign Supports – Saddle Brackets](#).
9. **Portable Sign Supports:** For regular posted speed limits ≥ 70 km/h, signs should be mounted 1.5 metres from the ground (to the bottom of the sign) on a crash-worthy portable sign support as shown in [Figure 4.1 C: Typical Sign Installation on Wind-Resistant Sign Stand](#).
10. For posted speed limits < 70 km/h, signs may be mounted less than 30 cm from the ground.
11. A lateral clearance of 60 cm should be maintained between the edge of the sign on a temporary support and the travelled way.
12. Consider the type and placement of sign supports when working around sidewalks, bicycle facilities, or areas designated for pedestrian or bicycle traffic.



NO CURB AND GUTTER



CURB and GUTTER

TEMPORARY SUPPORT

Figure 4.1 A: Typical Sign Installation Heights and Offsets



Figure 4.1 B: Barrier Mounted Sign Supports – Saddle Brackets

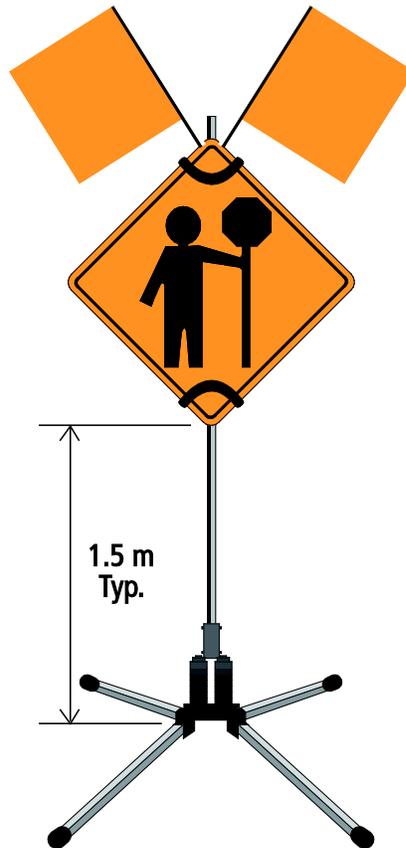


Figure 4.1 C: Typical Sign Installation on Wind-Resistant Sign Stand

4.2.7 Sign Selection

The standard signs shown in [Appendix B: Standard Construction Signs](#) should be used wherever possible. Custom signs should be approved by the Road Authority.

Select the appropriate layout in [Sections 7 to 19](#) that best describes the work.

4.2.8 Sign Placement and Spacing

Recommended advance placement distances for initial signs, and distances between subsequent signs in a series, are shown as dimensions in [Table A – Taper Lengths](#) and [Table B – Device Spacing Lengths](#) (see [Section 6.6](#) or [Appendix F](#)) as well as the layouts in [Sections 7 to 19](#).

In addition, follow these placement principles for signs:

1. On urban streets, sign spacing may have to be shortened because of the length of city blocks. Additional advance warning signs may be required because of the extra intersections created by alleys and accesses, and care should be taken to ensure that signs are not hidden by parked vehicles.
2. Signs should be positioned so that they do not block the sight lines of drivers entering a roadway from side roads or other access points.
3. All signs should be placed for best visibility, which may necessitate an increase or decrease in advance placement spacing.
4. Where cyclists and/or pedestrian may be present, signs should be placed to not interfere with their passage. When possible, a lateral clearance of 60 cm should be maintained between the edge of the sign and the travelled way.
5. On divided roadways and one-way streets with two or more lanes moving in the same direction, signs should be placed on both sides of the roadway if space is available. A median-mounted sign should be positioned straight across from the same sign on the shoulder.
6. If traffic queues extend into the advance warning area, additional warning signs should be placed upstream of the queue.
7. If work zones abut or overlap, the signs within the work zones or work areas should not conflict. Effective coordination and communication between the Traffic Control Supervisors before work commences should minimize such conflicts.

4.3 Dynamic Message Signs (DMS)

Dynamic message signs display words, numbers, and/or symbols that can be changed on demand to communicate real-time roadway, traffic, or traveller information. They include permanently-mounted overhead signs and portable messaging systems.

DMS should be used for both major and minor projects when the work impacts highway lane operations. Providing advance information to road users well in advance of the work zone positions them to respond to those conditions in a safe and timely manner.

4.3.1 Permanently-Mounted DMS

A permanently-mounted DMS is typically mounted overhead. It should be located within 80 km of the work zone to be used for the project works. Longer distances may be considered for projects on multilane divided highways.

The DMS message should use full words whenever possible, although commonly known abbreviations may be required in order to fit long messages onto the sign (see [Table 4.2: Common Message Abbreviations](#)).

4.3.2 Portable DMS

Portable dynamic message signs are shoulder-mounted or vehicle-mounted temporary traffic control devices that are used in advance of a work activity area or condition to supplement and enhance traffic control devices.

Portable DMSs are frequently used to:

- identify emergency conditions that require drivers to change their normal driving patterns
- identify work zones and provide instructions and/or warnings to drivers regarding the nature of the works and the required action
- inform drivers of alternative routes that may be used to minimize travel delays
- provide drivers with advance information regarding the timing of events such as road closures or traffic pattern changes related to the occurrence of special events
- advise of events that may affect traffic congestion or road closures

Table 4.2: Common Message Abbreviations

Word	Abbr.	Word	Abbr.
Ahead	AHD	Maintenance	MAINT
Alternating/Alternative	ALT	Minor	MNR
Boulevard	BLVD	Mountain Daylight Time	MDT
Cardinal Direction	N, E, W, S	Mountain Standard Time	MST
Construction	CONST	Pacific Daylight Time	PDT
Emergency	EMER	Parking	PKING
Entrance	ENT	Pavement	PVMT
Equipment	EQUIP	Prepare	PREP
Exit	EXT	Right	RT
Freeway	FWY	Road	RD
Hazardous	HAZ	Route	RTE
Highway	HWY	Shoulder	SHLDR
Information	INFO	Slippery	SLIP
Junction	JCT	Speed	SPD
Kilometre	KM	Summit	SMT
Lane	LN	Traffic	TRAF
Left	LT	Warning	WARN
Minutes	MIN	Vehicle	VEH

4.3.3 DMS Fundamentals

1. Abbreviated Messages

Some message boards are only eight characters wide, and abbreviations are preferred to hyphenated words.

HWY 3 CLOSED AVALANCH	BRIDGE WORK AND 1 LN OPEN	LT LANE CLOSED AHEAD	BIG HORN SHEEP NXT 30KM	ROAD CLOSED FLOODING
TCP AHD PREPARE TO STOP	INCIDENT AHD-USE EXT 123	LINE PAINTING 9-3DAILY	SINGLE LN TRAF AHD	FOLLOW PILOT CAR

2. DMS Placement

1. **Visibility:** A DMS should be visible to drivers from a distance of at least 400 m.
2. **Legibility:** A DMS should be legible to drivers at a distance of at least 250 m.
3. **Placement:** A DMS should be placed:
 - For speeds ≤ 60 km/h, at least 150 m ahead of the point of action (detour, work zone, etc.)
 - For speeds ≥ 70 km/h, at least 300 m ahead of the point of action
4. The lateral clearance between the outside edge of the raised sign board and the shoulder fog line/lane edge line should be at least 300 mm (12") to reduce the possibility that the sign will be hit. There should also be enough lateral clearance to ensure the safe passage of bicycles and pedestrians.

Limited lateral clearance should not preclude the use of a DMS because it is an excellent information tool for all road users.

- Drums/tubular markers should be placed on the approach side of the sign to provide notification and protection for road users. At least three channelizing devices should be placed in front of the sign on the traffic approach side.
 - In addition, sign trailers should be enhanced with red and white retroreflective tape.
5. There should be at least 2 m of vertical distance between the bottom of the sign and the road surface.
 6. DMS should not block visibility of other signs.
 7. The signs should be checked periodically for legibility. These checks should include time-of-day reviews to assess the impact of the sun on legibility, especially during spring and fall months.
 8. Two or more DMS may be used on the same approach. When multiple signs are used, they should be spaced at least 300 m apart.
 9. When placed on the road or highway right-of-way, the signs should be enhanced with conspicuity retroreflective sheeting or devices that delineate the sign when it is not in use.

3. Message Guidelines

1. The sign message should be kept clear and concise. A typical driver needs approximately 1 second to read a word and 1.5 to 2.0 seconds to read a phrase.
2. Do not use words like WARNING or CAUTION if using these words sacrifices the use of better information.
3. A DMS is typically limited to 3 lines with 8 characters per line, resulting in a maximum message size of 24 characters, including spaces (see [Section 4.3.3.1. Abbreviated Messages](#) above).
4. Full-matrix boards are capable of displaying symbols to enhance the messaging, and these symbols may be displayed with or without text.
5. A driver travelling at the speed limit should be able to read the message twice before passing the sign.
6. A longer message may be displayed in two phases if the message can be read twice at the speed limit.
7. [Table 4.3: Typical DMS Message Sequence](#) shows an example of a typical message sequence. Each message shall be displayed for at least 3 seconds.
8. [Table 4.4: Minimum DMS Character Size](#) shows the minimum character sizes to be used. It is possible to use 300 mm characters in high-speed areas on narrow, winding highways where the use of larger signs may not be feasible because of space limitations, but this variance shall be approved by the Road Authority.
9. Messages for work zones should not be allowed to become stale. Change the message every two to four days to command the attention of regular commuters.
10. Messages should not be flashed. The entire message phase shall be displayed at once.

Table 4.3: Typical DMS Message Sequence

Cycle 1		> REPEAT >	Cycle 2	
Phase 1	Phase 2		Repeated Phase 1	Repeated Phase 2
ROAD	LEFT		ROAD	LEFT
WORK	LANE		WORK	LANE
5 KM AHD	CLOSED	5 KM AHD	CLOSED	

View Time 3 Sec.

View Time 3 Sec.

View Time 3 Sec.

View Time 3 Sec.

Table 4.4: Minimum DMS Character Size

Character Size	Speed Classification	Comments
450 mm (18")	all speeds	<ul style="list-style-type: none"> Used on all Provincial highways unless otherwise specified by the Road Authority. May be used by other Road Authorities. Typically a trailer-mounted unit. Based on 275 metres viewing distance.
300 mm (12")	< 80 km/h	<ul style="list-style-type: none"> More commonly used by local Road Authorities where space allows and on rural roads. May be trailer-mounted or truck-mounted. Based on 150 metres viewing distance.
250 mm (10")	< 60 km/h	<ul style="list-style-type: none"> Typically used by local Road Authorities where space is limited or on shadow vehicles for mobile operations. 300 mm characters are desirable.

4. Operational Guidelines

1. A DMS should operate continuously and have a backup system that enables the unit to function if the primary energy source fails.
2. To maintain visibility, the units should automatically adjust brightness relative to ambient light conditions.
3. The signs should be inspected periodically to ensure that they are functioning correctly and displaying the appropriate message.
4. The units should be protected so that only authorized personnel have control of the displayed message.
5. When not in use, the signs should be positioned off the roadway or as far from the travel lane as practicable. The screen should be turned so that it is not visible to traffic.
6. Additional information on setting up and using a DMS is available in the US Federal Highway Administration (FHWA) publication entitled Portable Changeable Message Sign Handbook.

5. Message Types and Categories

Typical advance information message types for use on permanently-mounted and portable DMS units are shown below. This is not a comprehensive list. Other messages may be required to deal with particular incidents or conditions.

Table 4.5: Typical DMS Messages

Location Descriptors	Road Events	Road Conditions
Hwy X Closed	Collision	Bridge Wash Out
Exit XX Closed	Debris on Road	Mud Slide
Use Hwy XX	Hazardous Material Spill	Rock Slide
XXX Ahead	Hydro Lines Down	Traffic Signal Failure
Single Lane Traffic	Livestock on Road	Falling Rock
Single Lane Alternating	Material Spill	Flood
Right Lane Closed Ahead	Bridge Construction	Smoke
Left Lane Closed	Bridge Maintenance	Traffic Congestion
Centre Lane Closed	Line Painting	Water Ponding
One Lane Bridge	Mowing	Uneven Pavement
Mon-Fri	Night Work	Construction Speed Limit XX km/h
XX AM – XX PM	Paving Operations	Trucks Crossing
NEXT XX km	Road Construction	
Ramp Closed Ahead	Road Maintenance	
	Road Sweeping	
	Roadside Brushing	
	Rock Scaling	
	Seal Coating	
	Special Event	
	Utility Works	
	Triathlon in Progress	
	Bicycle Race in Progress	
	Marathon in Progress	

4.4 Pavement Markings

When permanent pavement markings are being removed for the work taking place, temporary pavement markings may need to be applied to establish the operation of the road until such time when permanent markings are re-applied. Channelizing devices should be used to separate traffic until temporary markings can be installed

Temporary pavement markings may consist of:

- paint with glass bead
- temporary pavement marking tape
- raised pavement markers (RPMs)
- temporary overlay markers (TOMs)

For long duration work, it may be beneficial to remove permanent pavement markings which are in conflict with the temporary traffic control.

Temporary pavement markings are never used to mark the edge (shoulder) of a roadway.

4.4.1 Removal of Pavement Markings

Various methods exist for removing permanent and temporary pavement markings as listed below. The method chosen for removing pavement markings should be approved by the Road Authority.

- high-pressure water-jetting (preferred)
- grinding
- burning
- chemical treatment
- sandblasting or shot-blasting
- painting over with black paint or bituminous material (for short-term applications only, which will require monitoring and possible re-application)

Poor eradication of pavement markings as shown below can cause the original markings to remain visible in low light and wet conditions, confusing drivers as to which markings apply.



Figure 4.2: Poor Eradication of Temporary Pavement Markings



Grinding



Hydro-Blasting

Figure 4.3: Pavement Marking Eradication Methods

4.4.2 Temporary Pavement Markings

1. Temporary pavement markings shall be the same colour as the permanent markings that they replace, be retroreflective, and display the same colour by night as they do by day.
2. Temporary pavement marking tape should consist of strips 100 mm (4") wide and at least 300 mm (12") long.
3. The markings should be placed in a skip line pattern with a maximum gap of approximately 10 metres between line segments.
4. When establishing temporary pavement markings, directional dividing lines should be installed first, followed by lane lines, if required.
5. Work zone passing areas should be based on the pre-existing passing areas.
6. Double broken directional dividing lines, two temporary pavement markings placed 10 to 30 cm apart, are required wherever passing is prohibited. To identify passing and no passing areas in work zones, Passing Permitted R-023 signs and Do Not Pass R-022-1 signs shall also be used in accordance with [Appendix B.2: Sizes and Applications of Individual Signs](#).
7. Stop lines should be approximately 300 mm wide, and pavement arrows should be at least one-third the size of standard arrows.
8. For highways where a median barrier, raised channelization, or a wide median is present but has been removed during construction, the directional dividing line should consist of a double broken yellow line. The separation between the broken yellow lines should be between 1.0 and 1.75 metres.
9. Temporary pavement markings should not be used to replace edge lines. If edge delineation is required, channelizing devices should be used.
10. [Figure 4.4: Temporary Pavement Marking – Dividing Line Layout Transition to Work Zone](#) illustrates the transition between the work activity area and the existing roadway. A 160-metre double broken yellow line transition should be used as shown in the figure.
11. On a final pavement lift, do not use a type of marking that will cause pavement damage when it is removed.

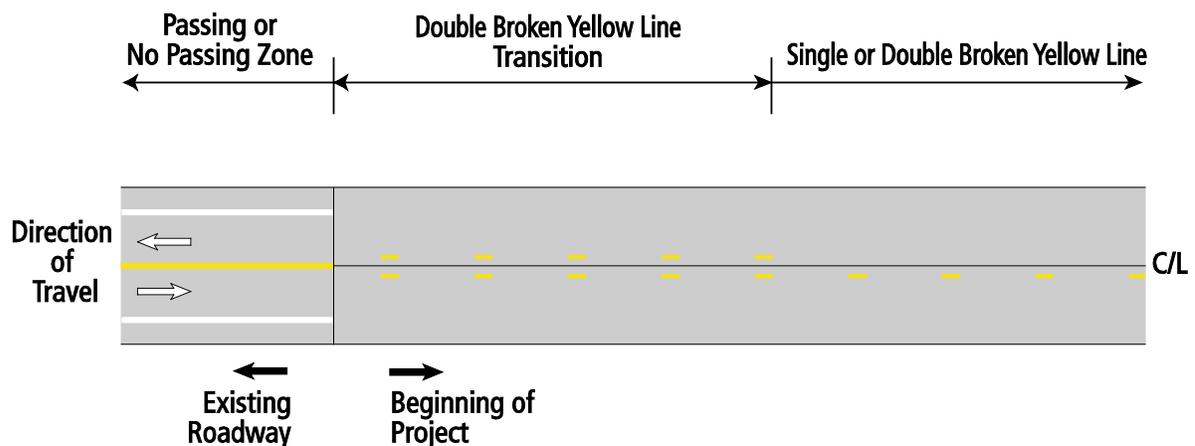


Figure 4.4: Temporary Pavement Marking – Dividing Line Layout Transition to Work Zone

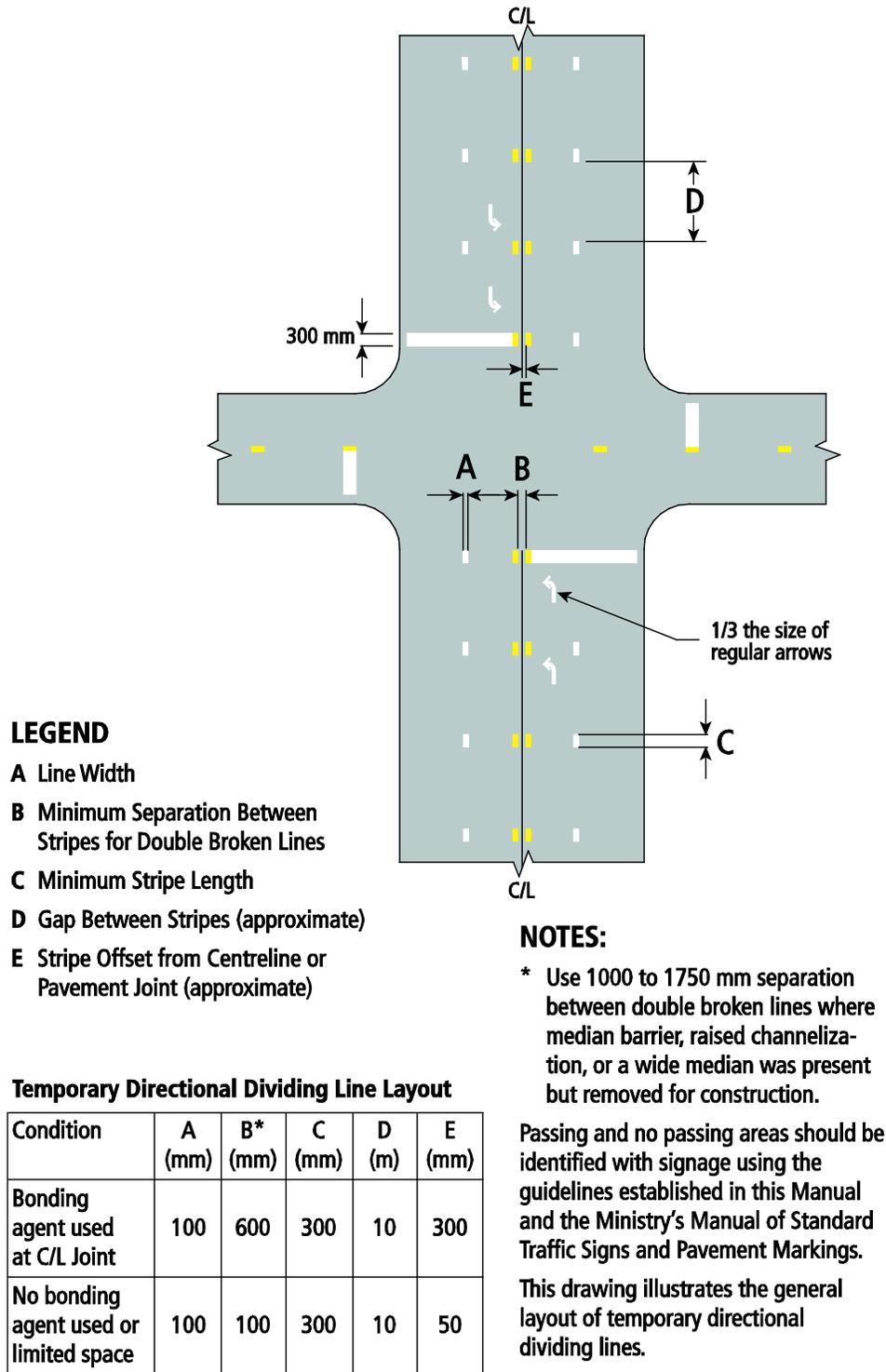


Figure 4.5: Temporary Pavement Markings – Directional Dividing Lane Layout at Intersections

4.4.3 Temporary Overlay Markers (TOMs)

Temporary overlay markers are used as a standalone temporary pavement marking or as a supplement to other temporary pavement marking types. They are installed for both directional dividing lines and lane lines. TOMs are the only practical marking type for seal coating work and milled pavement

These devices are beneficial through changes in horizontal or vertical alignment, in areas where speeds and/or volumes are high, and where adverse weather conditions (such as fog or rain) might reasonably be expected in hours of darkness.



Figure 4.6: Temporary Overlay Markers (TOMs)

As a supplemental device, TOMs should be installed at a frequency of at least every third temporary marking, with the raised face perpendicular to traffic. TOMs should be installed frequently enough that at least four successive markers are visible in the direction of travel.

4.5 Channelizing Devices

Channelizing devices are used to guide and direct road users through a work zone and around or away from hazards.

Channelizing devices include barriers, barricades, temporary lane separators, traffic cones, tubular markers, barrels/drums, vertical panels, and longitudinal channelizing barricades. Because they may be struck by errant vehicles, these devices are made crash-worthy (American Association of State Highway and Transportation Officials (AASHTO) [Manual for Assessing Safety Hardware](#) (MASH) tested).

Recommended spacing for channelizing devices is shown in the table below. A minimum of 5 devices is required for any taper.

Table 4.6: Excerpt from Table B – Device Spacing Lengths

Device Spacing (m)		Regulatory Speed Limit before Work Begins (km/h)							
		≤50	60	70	80	90	100	110	120
Channelizing Device Spacing for Tapers	C	10 m	10 m	15 m					
Max. Channelizing Device Spacing on Curves and Tangents	D	10 m	10 m	30 m	30 m	40 m	40 m	40 m	50 m

For the complete version of Table B, see [Section 6.6: Positioning of Temporary Traffic Control Devices](#) or [Appendix F](#).

All channelizing devices that require retroreflectivity as defined in this Manual shall have ASTM Type 6 or better on curved surfaces and ASTM Type 9 or better on rigid flat surfaces.

Channelizing devices are weighted to prevent the device from being knocked down or displaced.

- Extra weights are available from the device manufacturer and can vary in size from 3.6 to 18.0 kg (8 to 40 pounds), depending on the device type.
- The weights should be sized to provide maximum stability for the highway operating conditions and the climatic conditions.
- For some devices, typically barricades, sandbags may be placed over the base to provide added stability.
- Sandbags are not to be used as standalone channelizing devices.

Where required to increase visibility, secondary devices made of lightweight materials and approved by the Road Authority may be attached to the tops of channelizing devices if the additions do not significantly decrease their stability or increase their hazard potential.

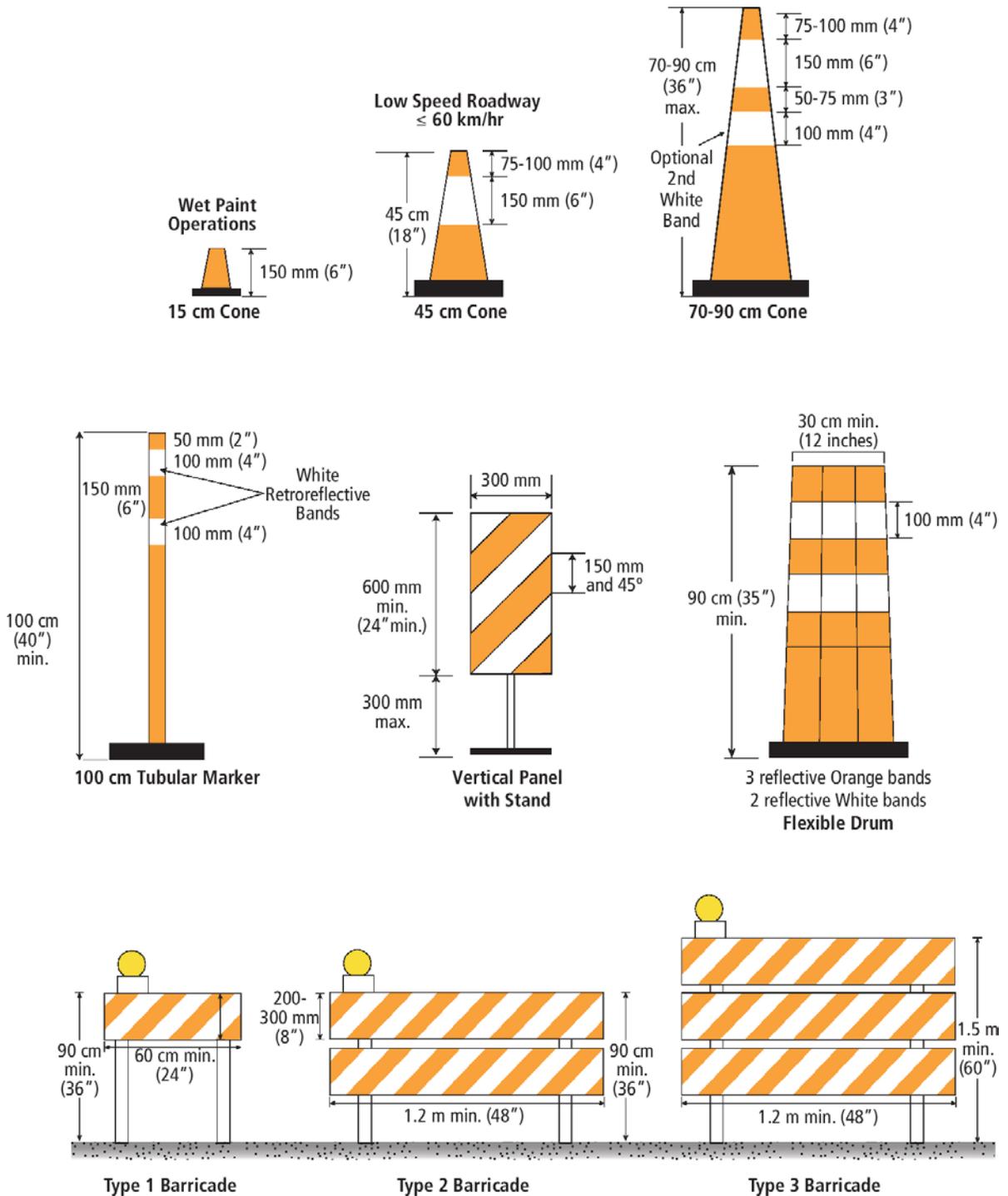


Figure 4.7: Channelizing Devices

4.5.1 Cones

Cones are lightweight, flexible, channelization devices, and should be made of material that can be struck without causing damage. They are easy to install and remove, and can be nested for storage and transportation. Weighted bases may be used to increase the stability of the cone. Due to the light weight, cones should be checked frequently for correct positioning.

Cones are used primarily for daylight operations. If they are used at night, they shall have retroreflective bands. The upper retroreflective band should be 15 cm (6") wide and located 8 to 10 cm (3" to 4") from the top of the cone. For 90 cm cones, a second band 10 cm (4") wide should be located approximately 5 cm (2") below the first.

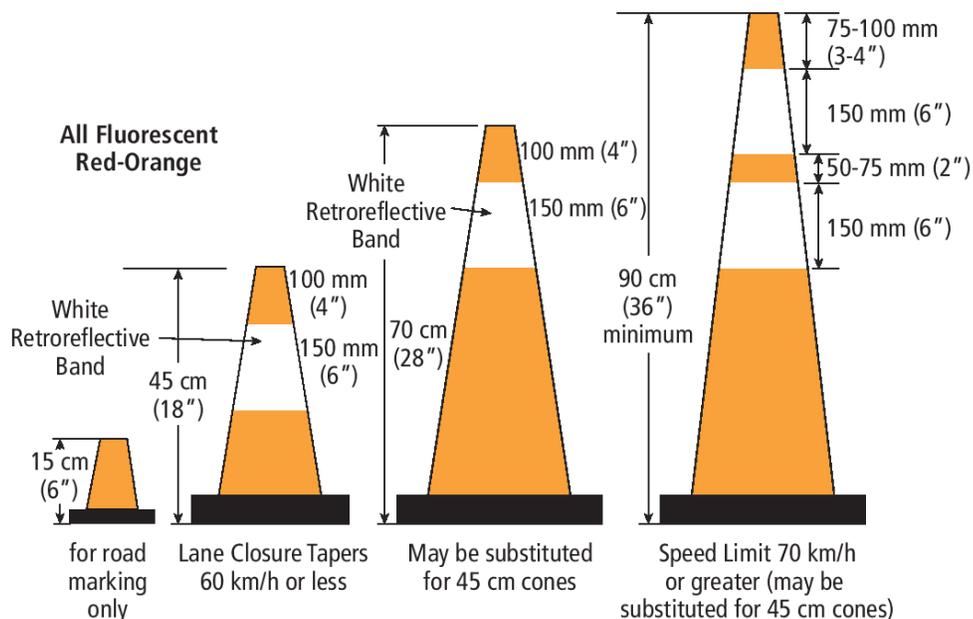


Figure 4.8: Cones

- **15 cm (6") cones** are used only to protect freshly applied pavement markings during the drying process.
- **45 cm (18") cones** are the type most commonly used for traffic control, usually to delineate work activity areas and specific hazards that are in or adjacent to the travel path.

They may also be used to form the shorter tapers required for shoulder work or for travel lanes when traffic is controlled by Traffic Control Persons, portable lane control signals, or temporary traffic signals.

If the regular posted speed limit is ≤ 60 km/h and traffic is free flow, 45 cm cones may be used for full lane closure tapers. In these lower speed zones, smaller 30 cm (12") cones may be substituted for 45 cm cones in any application at the discretion of the Road Authority.

- **70 cm (28") cones** may be substituted for 45 cm cones in any application where the additional height would be advantageous. They may be used on high-speed roadways, or at night.
- **90 cm (36") cones** may be a substitute for tubular markers.

4.5.2 Tubular Markers (Tubes)

Tubular markers (tubes) are lightweight channelizing devices which are easy to install and remove. They are particularly good for delineating travel lanes.

They are predominantly orange, and made of a material that can be struck without causing damage to the impacting vehicle. They include two retroreflective bands. Tubes should be at least 100 cm (40") high and 10 cm (4") in diameter. Other dimensions may be used for specific applications only if approved by the Road Authority.

Tubular markers may be used to divide travel lanes and delineate the edge of a pavement drop-off if space limitations prevent the use of larger devices.

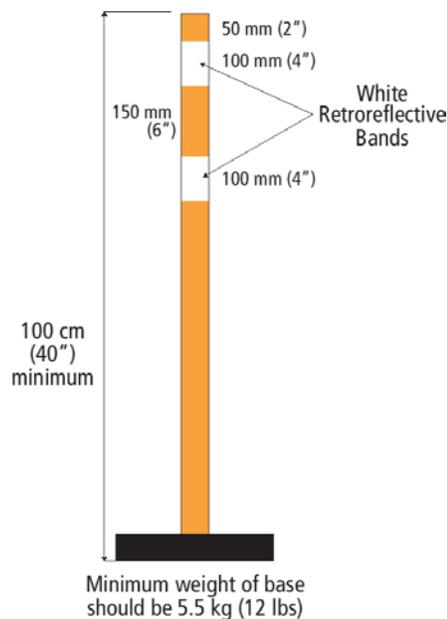


Figure 4.9: Tubular Markers

Tubes should not be a substitute for drums or barricades to mark hazards or to close roadways, unless space restrictions prevent the use of more visible devices.

Tubes are stabilized by using weighted bases or weights like sandbag rings that can be dropped over them and onto the base. The weighted base should weigh at least 5.5 kg (12 pounds). Additional weights may be required in high-speed applications and where road conditions dictate.

Tubular markers used on Provincial highways shall have two white retroreflective bands at least 100 mm (4") wide near the top of the post. The first band is placed approximately 50 mm (2") down from the top edge, and the gap between the bands is approximately 150 mm (6").

Tubes may replace 45 cm and 70 cm cones in any of their applications if reasonable stability is assured.

4.5.3 Drums/Barrels

Drums or barrels (drums) are a highly visible warning and channelizing device. They are constructed of lightweight, deformable materials. They appear to be solid and therefore command the respect of drivers.

On multilane highways, they are used to delineate opposing flows of traffic, especially where a median barrier has been removed for repaving operations.

Drums are predominantly orange, and shall have five uniformly-spaced retroreflective bands at least 100 mm (4") wide of fluorescent orange and white as shown in [Figure 4.10: Drum](#).

Drums are generally at least 90 cm (36") tall, at least 45 cm (18") wide at the base, and at least 30 cm (12") wide at the top.

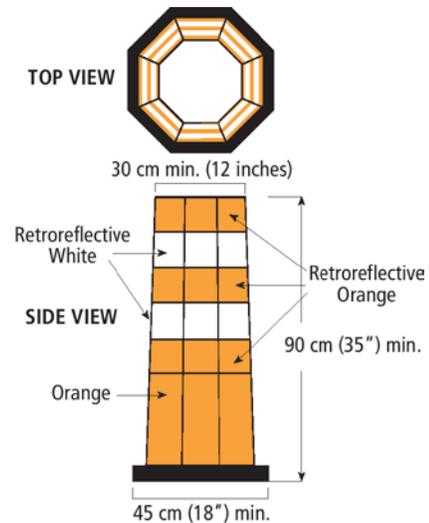


Figure 4.10: Drum

Drums are most commonly used to define leading tapers, to mark equipment areas on the side of the road, provide delineation when barrier has been removed, and in areas where additional emphasis is needed.

These principles apply when using drums:

- Drums should not be weighted with sand, water, or any other material to an extent that would make them hazardous when striking road users or workers.
- Drums used in regions susceptible to freezing should have drain holes in the bottom so that water will not accumulate and freeze.
- Ballast shall not be placed inside or on the top of a drum. If extra weight is required, sandbags or weighted rings may be added around the outside of the base.
- Flashers may be used where required, and to increase visibility (see [Section 4.9.2: Yellow Warning Lights](#) for more information).

4.5.4 Surface-Mounted Delineators

Surface-mounted delineators may be used on the centreline to separate opposing traffic on a two-lane, two-way roadway. They are predominantly orange, and made of a material that can be struck without causing damage to the impacting vehicle.

They are fastened directly to the pavement surface. Non-cylindrical delineators are attached to the pavement in a manner whereby they display at least a 60 mm (2.5") of width to all approaching road users.

Surface-mounted delineators shall be retroreflective or equipped with lighting devices for maximum visibility.

Retroreflectivity for 90 cm (36") or larger delineators shall be provided by a white band 100 mm (4") wide and positioned 50 mm (2") from the top of the delineator.

An additional white band 100 mm (4") wide shall be positioned approximately 150 mm (6") below the 100 mm (4") band.

Surface-mounted delineators should not be substituted for drums or barricades to mark hazards or to close roadways.

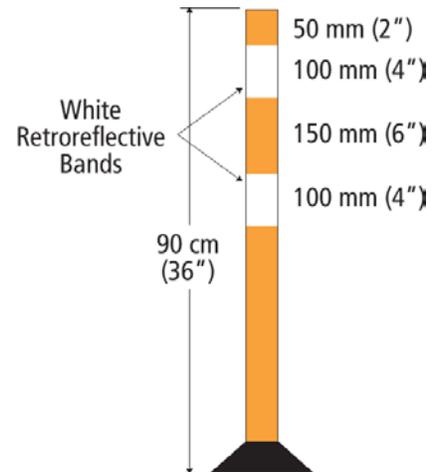


Figure 4.11:
Surface-Mounted Delineator

4.5.5 Post-Mounted Delineators

Post-mounted delineators are most commonly used in long-duration work zones to mark the edge of roadway through diversions. They are used in combination with, or to supplement other, temporary traffic control devices.

They shall be mounted on crash-worthy supports (typically square perforated tubing) so that the retroreflective surface is approximately 100 cm (39") above the nearest roadway edge. The retroreflective tape used on post-mounted delineators shall be the same colour as the pavement markings they supplement.

The delineators should be either 15 cm x 15 cm (6" x 6") squares or 7.6 cm wide x 30 cm long (3" x 12") rectangles.

4.5.6 Vertical Panels

Vertical panels have a retroreflective, striped face that is at least 300 mm (12") wide and 600 mm (24") high. They may be stand mounted, fixed (bolted) directly to the road surface, or fixed by a proprietary curb mounting system.

They shall have alternating, diagonal fluorescent orange and white retroreflective stripes sloping downward at a 45-degree angle in the direction road users are to pass.

Where space is limited, vertical panels may be used to channelize vehicular traffic, divide opposing lanes, or replace barricades. On curves, they should be angled towards approaching traffic.

Vertical panels are not to be used for tapers in high speed environments, but may be used for tapers in urban low speed environments where the regular posted speed limit is ≤ 60 km/h.

When used as channelizing devices, vertical panels shall be secured such that the side facing traffic is at least 300 mm (12") wide and 600 mm (24") high.



Figure 4.12 A:
Vertical Panel



Figure 4.12 B: Example of Curb-mounted Vertical Panels¹

¹ Picture from <http://www.gwickkurb.com/work-zone-applications/>

4.5.7 Direction Indicator Barricade/Panel

Direction Indicator Barricades/Panels have a One-Direction Large Arrow sign mounted above a diagonal striped, horizontally aligned, retroreflective rail. The One-Direction Large Arrow sign shall be black on an orange background. The stripes on the bottom rail shall be alternating diagonal fluorescent orange and white retroreflective stripes sloping downward at a 45-degree angle in the direction road users are to pass.

The stripes are 100 mm (4") wide. The One-Direction Large Arrow sign is 60 cm x 30 cm (24" x 12"). The bottom rail shall have a length of 60 cm (24") and a height of 200 mm (8").

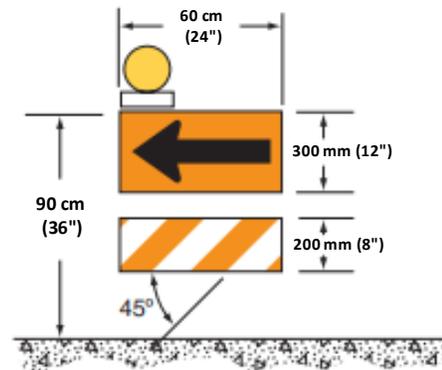


Figure 4.13 A: Direction Indicator Barricade/Panel

The Direction Indicator Barricade/Panel may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary. Direction Indicator Barricades/Panels should be placed uniformly in series to direct the driver through the transition and into the intended travel lane. As an alternative to barrels in tapers/transitions, spacing patterns should coincide with that for barrels.

Due to the sign panels wind sail area, and overall light weight, direction indicator barricade/panels to prevent blow over on higher speed facilities may require weighting by methodologies such as sand bags, or other methods.



Figure 4.13 B: Direction Indicator Barricade/Panels Used for Taper



Figure 4.13 C: Example of Direction Indicator Barricade/Panels used with Vertical Panels²

² Picture from http://www.plasticade.com/traffic_safety/channelizers/verticade/

4.5.8 Barricades

Barricades are portable or fixed devices that are highly visible and relatively frangible. They are used to mark or restrict all or a portion of a roadway, especially areas into which most traffic is not to proceed, and are used in a series to channelize road users. Barricades are not designed to contain or redirect errant vehicles, and are not to be used to replace barriers.

There are three barricade types, each with particular applications. If appropriate, a higher type barricade may be substituted for a lower type.

Type 1 and Type 1A (formerly Class I and Class IA) barricades have one rail board. They are used on conventional roads and urban streets, generally for marking temporary hazards, delineating areas temporarily closed to traffic, and channelizing vehicles and pedestrians.



Figure 4.14 A: Type 1A Barricade



Figure 4.14 B: Type 1 Barricade

Type 2 (formerly Class II) barricades have two rail boards. They are used for temporary closures of high-volume, low-speed urban roads, and for channelization and temporary closures that will be in place for several days.



Figure 4.14 C: Type 2 Barricade

Type 3 (formerly Class III) barricades have three rail boards, and are used to close or partially close roads, and for temporary closures that will last for some time.

Type 2 and Type 3 barricades should be used on freeways, expressways, and other high-speed roads.

All barricade types can be used as sign supports.

Type 1A barricades shall be at least 60 cm (24") wide. Types 1, 2, and 3 barricades should be at least 1.2 metres (47") wide. Each rail board shall be 200 mm to 300 mm (8" to 12") wide.

Each rail shall have alternating fluorescent orange and white retroreflective stripes, sloping downward at a 45-degree angle. Rail stripe widths are 150 mm (6"). 100 mm (4") wide stripes may be used if rail lengths are less than 90 cm (36").

Alternating black and orange stripes are also acceptable, and may be a better option, depending on the background and contrast presented by the environment. An assessment of the area should be conducted to determine the most suitable colour pattern.



Figure 4.15: Type 1 Black and Orange Barricade

Follow these guidelines when using barricades:

1. Where barricades extend entirely across a roadway, the stripes should slope downward in the direction toward which road users are to pass. Where both right and left turns are provided, the stripes should slope downward in both directions from the center of the barricade or barricades. Where no turns are intended, the stripes should slope downward toward the center of the barricade or barricades.
2. Barricades used on expressways, freeways, and other high-speed roadways shall have at least 1,700 square centimeters (270 square inches) of retroreflective area facing traffic. Where traffic may approach a barricade from either side, the barricade should be retroreflective on both sides, or two barricades should be positioned back-to-back.
3. Road Closed R-012, Local Traffic Only R-012-T, and Detour C-005-LR signs may be attached to the highest barricade rail if required.
4. When a highway is closed but access is still allowed for local road users, barricades are not normally extended completely across the roadway.
5. Flashers may be used on top of the barricade to increase visibility (see [Section 4.9.2: Yellow Warning Lights](#)).
6. The stability of portable barricades can be enhanced by using sandbags, provided that they are placed on or close to the barricade bases. Weight should not be placed on the top of any rail. Non-deformable objects like rocks or concrete should not be used to weight the barricade.

4.5.9 Temporary Roadside/Median Barrier

In temporary traffic control, barrier and barricades are two different and distinct devices.

- **Barricades** (see [Section 4.5.8: Barricades](#)) are lightweight devices that are relatively forgiving of errant vehicles. They are normally placed at or nearly at right angles to approaching traffic to provide visual identification of hazardous locations and to delineate travel paths.
- **Barrier** is designed to contain and redirect errant vehicles. It is a solid, continuous installation designed to deflect errant vehicles at a small angle, thereby preventing them from entering a closed or hazardous area. It is normally placed parallel to or nearly parallel to approaching traffic.

Traffic Control Plans should include details regarding barrier installations. Barrier should be designed to meet American Association of State Highway and Transportation Officials (AASHTO) [Manual for Assessing Safety Hardware](#) (MASH) unless otherwise specified by the Road Authority.

The Ministry requires that temporary barrier, flares, and/or crash attenuators be installed in accordance with the latest edition of the [BC Supplement to Transportation Association of Canada \(TAC\) Geometric Design Guide for Canadian Roads](#), or in accordance with manufacturer specifications (in the case of proprietary barriers) under the direction of an Engineer.



Figure 4.16: Concrete Roadside Barrier

These alternatives to barriers should be considered because of the risks to drivers and to the workers involved in installing and removing temporary traffic barriers:

- nightly backfill of excavations
- temporary tapers
- temporary detours or crossovers
- for lower-speed projects, additional or closer spacing of channelizing devices in conjunction with extra delineation (e.g., temporary raised pavement markers), and extra warning signs in advance of and within the work activity area

Temporary barrier is typically used:

- To separate road users from work activity areas, such as excavations, exposed objects, and material storage sites.
- To separate opposing directions of traffic.
- To separate workers, cyclists, and pedestrians from vehicle traffic.
- To separate traffic from drop-offs greater than 30 cm (12") (see [Section 6.5: Treatment of Drop-Offs and Travel Lane Excavations](#)).

Follow these guidelines when using barrier:

- Barriers used as channelizing devices should be equipped with reflectors and/or Type A, B, or C yellow lights (see [Section 4.9.2: Yellow Warning Lights](#)).
- If sufficient room is available, a solid lane edge line may be installed to indicate shy distance.
- When barrier is used for lane closures, they shall be preceded by devices placed for a standard lane closure taper.
- When barrier restricts roadway width, enough width should be provided for the largest anticipated vehicle.

4.5.10 Temporary Lane Separators

Temporary lane separators may be used to:

- channelize road users
- divide opposing vehicular travel lanes
- divide lanes when two or more lanes are open in the same direction
- provide continuous pedestrian channelization

They may be supplemented by any of the other approved channelizing devices identified in [Section 4.5: Channelizing Devices](#), such as tubular markers, vertical panels, and other devices used as lane dividers for opposing traffic.

Temporary lane separators should have retroreflectivity.

Temporary lane separators have a low-profile base designed for connecting the individual separator units together. The base shall be no more than 100 mm high and 300 mm wide, and have sloping sides to facilitate crossover by emergency vehicles.

Each unit should be temporarily affixed to the pavement.

At pedestrian crossing locations, temporary lane separators shall have an opening to provide a pathway that is at least 1.5 metres wide.

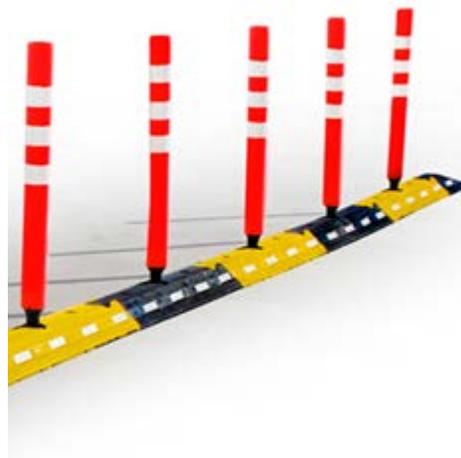


Figure 4.17: Temporary Lane Separators

4.5.11 Longitudinal Channelizing Devices

Longitudinal channelizing devices are lightweight, deformable devices which are highly visible and can be connected together to provide continuous delineation. They may be hollow, and may be filled with water as ballast only in areas where the water cannot freeze.



Figure 4.18: Interconnecting Device

Follow these guidelines when using longitudinal channelizing devices:

1. If used singly as Type 1, 2, or 3 barricades, longitudinal channelizing devices should comply with the general size, colour, stripe pattern, retroreflectivity, and placement standards for the barricades.
2. They may be used instead of a line of cones, tubes, or drums.
3. When used at night, they should include retroreflective material for improved visibility.
4. They may be used for pedestrian control, in which case they should be interlocked to channelize flow. The interlocking devices should not have gaps that allow pedestrians to stray from the channelizing path.
5. They need not meet the crash-worthy requirements for temporary traffic barriers so they should not be used to shield obstacles or to provide positive protection for pedestrians or workers.

4.5.12 Other Channelizing Devices

Channelizing devices other than the standard devices described in this Manual may be suggested for use in work zone applications. Using non-standard devices for work on roadways and rights-of-way requires the approval of the Road Authority.

Other channelizing devices should conform to the general size, colour, pattern, retroreflectivity, and placement standards described above.

4.6 Flashing Arrow Boards (FABs)

Flashing arrow boards (FABs) are signs with a matrix of elements that are capable of either flashing or sequential displays. They are very effective both day and night, providing additional warning and directional information that assists with controlling and merging road users through or around a work zone.

Their main purpose on multilane roadways is to direct traffic from a closed lane into another available lane with appropriate arrow indications. They can be used for either static or moving operations. Normally only one arrow head is displayed at a time.

Without directional indication, FABs can be used in place of, or in addition to, 4-way flashers and 360-degree warning lights to create a more visible warning that work is in progress. They can be mounted on trucks or trailers for both stationary and moving operations.

FABs **shall not be used** in directional display mode when:

- A lane closure is not required.
- All the work is on or outside the shoulder, and there is no need to close the adjacent travel lane.
- A Traffic Control Person is controlling traffic on what is normally a two-lane, two-way roadway.

4.6.1 FAB Specifications

1. Types

Flashing arrow boards are differentiated by size, where:

- **Type A** arrow boards are for low-speed urban streets.
- **Type B** arrow boards are for intermediate-speed facilities and maintenance or mobile operations on high-speed roadways.
- **Type C** arrow boards are for projects on high-speed, high-volume highways.
- **Type D** arrow boards are for use on vehicles authorized by the Road Authority.

Type A, B, and C arrow boards should have a solid rectangular appearance. Type D arrow boards conform to the shape of the arrow. The Ministry includes, under Type D, 16-lamp minimum arrow sticks with arrow heads. All arrow board faces (excluding arrow sticks) should be finished in non-reflective black.



Figure 4.19 A: Type D Arrow Board

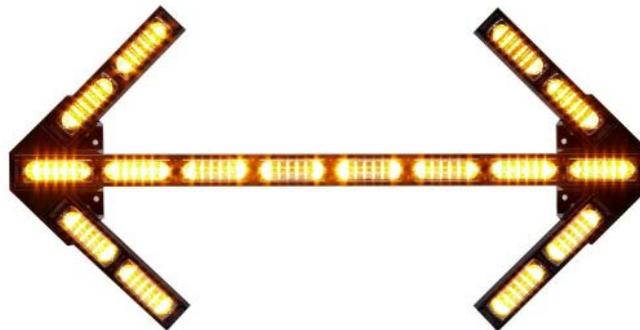


Figure 4.19 B: Example of Type D Arrow Board - Arrow Stick with Arrowheads³

³ Picture from: https://www.whelen.com/auto/product?head_id=10&cat_id=70&prod_id=387

2. Minimum Requirements

FABs shall meet minimum requirements for size, legibility distance, number of elements, and other factors for the highway classification on which they are used.

Table 4.7: Minimum Requirements for Arrow Board Panels

Arrow Board Type	Minimum Size (arrow length x arrow-head width)	Minimum Visibility Distance	Minimum Number of Elements	Application (regular posted speed limit)
A rectangular board	120 cm x 60 cm (48" x 24")	600 metres	12	Short duration work ≤ 60 km/h
B rectangular board	152 cm x 75 cm (60" x 30")	800 metres	13	Short or Long duration work ≤ 60 km/h
C* rectangular board	244 cm x 120 cm (96" x 48")	1,000 metres	15	Short or Long duration work ≥ 70 km/h
D arrow-shaped board (truck-mounted)	120 cm x 60 cm (48" x 24")	600 metres	12 (16 for arrow shaped sticks with arrowheads)	Mobile work OR Short duration work ≤ 60 km/h
<p>Notes:</p> <p>The 90 cm x 45 cm size is no longer included but may continue to be used for lower speed applications (≤ 50 km/h).</p> <p>* For mobile operations, truck mounted arrow shaped boards at least 150 cm x 75 cm may be used instead of Type C arrow boards.</p>				

3. Visibility and Light Intensity

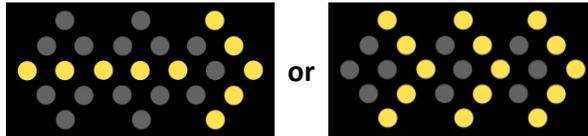
When using smaller arrow boards, ensure that the sign is conspicuous to approaching drivers and the arrow shape is retained, particularly for lane closures.

Vehicle-mounted arrow boards should have remote controls and elements capable of at least 50% dimming from full brilliance. Full brilliance should be used for day-time operations, and a dimmed mode should be used for night-time operations.

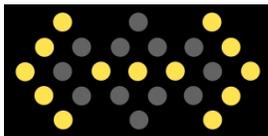
4. Display Mode

Yellow elements are used to display the three common display modes on FABs:

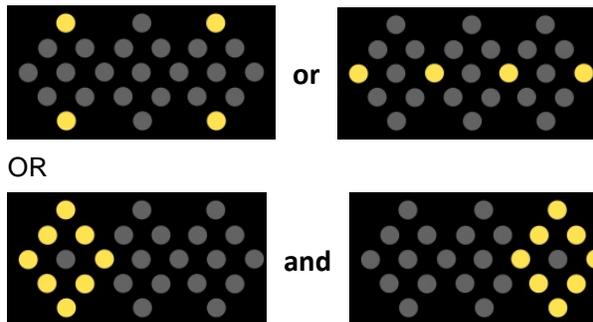
1. flashing arrow, sequential arrow, or sequential chevron directional display mode:



2. flashing double arrow mode:



3. flashing caution mode OR alternating diamond caution mode:



The elements of a bulb-matrix FAB should be recess-mounted or equipped with an upper hood of not less than 180 degrees.

4.6.2 FAB Setup

A FAB is mounted on a vehicle, trailer, or other suitable support.

The minimum mounting height measured vertically from the bottom of the board to the roadway should be 2.0 m. Vehicle-mounted arrow boards are mounted at a height of at least 1.0 m.

A FAB should always be used in combination with appropriate signs, channelizing devices, and/or other temporary traffic control devices. It is generally placed within a closed lane. It should be delineated with tubes or drums at all times. When it is not being used, the FAB should be removed from the roadway.

When a FAB is placed on the shoulder in caution mode, it should be delineated with an appropriate shoulder closure taper.

For short-duration work on high-speed, non-freeway roadways, Type A FABs may be used on larger utility vehicles if Type B or Type C FABs cannot be physically accommodated.

Driver sight lines should be assessed when placing FABs to ensure maximum visibility without creating a hazard. Considering the curvature of the roadway, place the FAB in a position where there are no visual obstructions between it and the driver.

FABs should be set up as follows:

1. **For a lane closure that uses a stationary FAB (trailer-mounted),** the arrow board should be positioned at one of the following locations:
 - a. On the shoulder (outside the travel lane), at the beginning of the merging taper, or
 - b. Within the closed lane, at the end of the merging taper.
2. **For a lane closure that uses a mobile FAB (truck-mounted),** the arrow board should be positioned to provide enough separation from the work operation to allow approaching drivers to react appropriately.
3. **For multiple lane closures,** a separate arrow board shall be used for each closed lane.

4.6.3 FAB Operation

1. Determine the appropriate FAB display option based on the traffic control layout.
2. For flashing and sequencing arrow boards, the minimum element “on time” shall be 50% for the flashing mode, with equal intervals of 25% for each sequential phase. The flash rate should be between 25 and 40 flashes per minute.
Sequencing arrow panels have several arrowheads that flash in a series, directing traffic to the right or left.
3. An arrow board in arrow or chevron mode can be used only for stationary or moving lane closures on multilane roadways.
4. An arrow board may be used in caution mode in situations that include, but are not limited to:
 - roadside work on or near the shoulder
 - temporarily closing one lane on a two-lane, two-way roadway
5. A Dynamic Message Sign (DMS) may be used to simulate an arrow board display.

4.6.4 Arrow Stick (Without Arrowhead)

Arrow sticks are vehicle-mounted sequential flashing devices used to supplement other temporary traffic control devices. They shall not be used as a replacement for FABs.

An arrow stick can be used to indicate “move/merge...right/left.”

They can also be used as a flashing bar to indicate that caution is required.



Figure 4.20: Arrow Sticks

4.7 Automated Flagger Assistance Devices (AFADs)

An Automated Flagger Assistance Device (AFAD) is an automated flagging machine that features a circular red lens, a circular yellow lens, and a gate arm. It is used to stop traffic, but it is not a portable traffic signal (see [Section 4.8: Temporary and Portable Traffic Signals](#)). It is essentially an extension of the TCP's arm.

The TCP operates the AFAD using a remote control rather than a paddle to control traffic movement. This enables the TCP to be positioned outside the travel lane. Two AFADs can be operated by a single TCP at one end of the work activity or at a central location, or multiple AFADs can be operated by multiple TCPs, each positioned near an AFAD.



Figure 4.21: AFAD in STOP Position

4.7.1 Operation Modes

1. For road users to **stop**, the AFAD shall display a **steadily-illuminated red lens** with the gate arm in the down position.
2. For road users to **proceed**, the AFAD shall display a **flashing yellow** lens with the gate arm in the upright position.
3. For the **change** interval between flashing yellow and steady red, the AFAD shall display a **steadily-illuminated yellow lens** with the gate arm remaining in the upright position. The change interval should be at least 3 seconds unless a different duration is approved by engineering judgment. There is no change interval between the steady red and flashing yellow displays.

4.7.2 Deployment Guidelines

1. AFADs may be used only on two-lane, two-way roadways and on multilane roadways that have been reduced to one lane.
2. When used at night, the AFAD station shall be illuminated with overhead lighting.
3. The construction speed limit where AFADs are used shall be ≤ 70 km/h. High-speed roadways require a speed reduction.
4. An AFAD is not a traffic control signal, and it cannot be used to replace or substitute for a continuously-operating temporary traffic control signal.
5. An AFAD can be operated only by a TCP who has been trained to operate it.
6. A TCP operating an AFAD shall not leave it unattended at any time while it is in use.

4.7.3 Equipment Requirements

1. The AFAD shall have two 300 mm diameter signal lenses—i.e., a lens that displays solid red above a lens that displays flashing yellow. The flashing yellow lens shall also have solid yellow capability for change intervals.
2. The AFAD shall have a conflict monitor that prevents simultaneous illumination of the red and yellow lenses on the same device.
3. The AFAD shall have a gate arm with the following properties:
 - A fluorescent orange or red flag shall be installed at the end of the gate arm when the AFAD is in use.
 - The gate arm shall measure no less than 2.44 m (8 feet) in length and shall have a vertical aspect of at least 100 mm (4 in).• The gate arm shall lower and remain lowered on a red signal.
 - The gate arm shall rise to an upright position on a flashing yellow signal.
 - The gate arm shall have retroreflectivity on both sides with alternating fluorescent red and white bands. The bands shall be 200 mm (8") long measured horizontally.
4. A black-on-white STOP HERE ON RED or STOP HERE ON RED SIGNAL sign shall be installed on the right side of the approach at the point where drivers are expected to stop. This sign is typically provided with the AFAD, and may be installed on it.
5. The AFAD shall be positioned in a location where the end of the arm shall reach at least to the center of the lane being controlled.

4.7.4 AFAD Placement and Operating Options

AFADs are placed either at each end of the work activity area or at one end of the work activity area with a TCP at the opposite end. Signing and AFAD placement are shown in [Section 7.9: Lane Closure with AFADs](#).

The preferred operating option is to have a TCP controller for each AFAD. Assigning a TCP to each device becomes more critical on high-volume roadways and in more complex work zones where construction traffic may be entering and exiting frequently. For simpler, lower-volume situations where there are good sight lines, a single TCP may control up to two AFADs:

1. Two-TCP Operation (Typical):

- One TCP operates each AFAD at either end of the work activity area; or
- One TCP operates an AFAD at one end of the work activity area and the second TCP controls traffic with a paddle at the other end.

2. Single-TCP Operation:

- One TCP positioned in a central location simultaneously operates two AFADs that are positioned at either end of the work activity area; or
- One TCP operates a single AFAD that is positioned at one end of the work activity area while also controlling traffic with a paddle at the opposite end.

In a single-TCP operation, all of these conditions shall be met:

- The TCP has an unobstructed view of the AFAD(s).
- The TCP has unobstructed views of approaching traffic in both directions.
- The average daily traffic volume on the roadway is 6,000 vehicles or less.
- The maximum distance between traffic control stations (TCP or AFAD) is 250 m.

Conflicting displays that release traffic in both directions simultaneously should be prevented by establishing clear communication procedures for fail-safe operation before work commences.

A TCP shall not activate the flashing yellow display (proceed) until the last vehicle from the opposing queue has cleared the work activity area.

4.8 Temporary and Portable Traffic Signals

Temporary traffic signals replicate Ministry traffic signals at intersections. They are a hard-wired traffic control system installed on standard Ministry signal poles or Ministry approved alternative, usually with an uninterruptible power supply (UPS), and are designed to Ministry standards. For more information on temporary traffic signals and their use, see the Ministry's [Electrical and Traffic Engineering Manual](#) or contact the Ministry's Traffic and Highway Safety Engineering team.

Portable traffic signals are mobile traffic control systems where a minimum of two signal heads are mounted on a self-contained trailer, usually powered by batteries whose charging mechanism is either through solar panels or a portable generator. These signals may include pedestrian and cycling type signal displays to address all types of road users.

Acceptance by the Road Authority is required prior to using Temporary or Portable Traffic Signals.

4.8.1 Portable Traffic Signals (Class 1 and 2) - Deployment Guidelines

A portable traffic signal is a mobile traffic control system which can control all types of road users. The portable traffic signal allows alternating directional flows where lane, shoulder and/or walkway constraints are in place.

Portable traffic signals consist of a minimum of two signal heads which are mounted on a self-contained trailer. These signals may include pedestrian and cycling type signal displays to address all types of road users. Both Class 1 and Class 2 portable traffic signals are capable of using various means, such as loops and/or push buttons, to activate displays. This allows on-demand alternative timing plans to be called based on road user type.

In addition, fixed-time portable traffic signals may have countdown timers which typically count down the time remaining until the signal turns green again. Countdown timers provide road users with knowledge of wait times. This reduces frustration and potential non-compliance to the signal display. Countdown timers are particularly advantageous in the following situations:

- When signals are far apart and clearance times are long,
- Where there is no visibility to the opposing signal, and/or
- When alternative timing plans are utilized for non-vehicular modes of traffic

Portable traffic signals can be used in specific circumstances to regulate single-lane alternating traffic during long-duration work—for example, on single-lane bridges and in rural construction environments. They may not be appropriate in mobile work zones and in work zones where there are several access and egress requirements for public and construction traffic.



Figure 4.22 A: Portable Traffic Signal Mounted on Trailer



Figure 4.22 B: Portable Traffic Signal with Countdown Timer – Red Display



Figure 4.22 C: Portable Traffic Signal with Countdown Timer – Green Display

Portable traffic signals should be inspected at least once a day as battery life is critical for operation. Other inspection frequencies may be used if justification is accepted by the Road Authority.

There are two operational classes of portable traffic signals:

1. **Class 1 Portable Signal:** A fixed-time signal used for short-duration work in low-speed environments (≤ 60 km/h) and where advance warning flashers are not required. A Traffic Engineer need not prepare the timing sheet for this signal.
2. **Class 2 Portable Signal:** An actuated signal or fixed-time signal used for long-duration work, and/or in high-speed environments (≥ 70 km/h), and/or where advance warning flashers are required. A Traffic Engineer shall prepare the timing sheet for this signal.

Portable traffic signals are used primarily to provide bi-directional traffic control in longer-term work zones. Typically, a pair of signals is set up at the perimeter of a roadway construction site, and signal communication is provided via radio interface.

Each signal unit shall have at least two signal heads for each approach and shall be positioned so that at least one signal head is overhead and one is side-mounted (see [Figure 4.22 A: Portable Traffic Signal Mounted on Trailer](#)). The signal heads should consist of three coloured displays with 300 mm (12") lenses.

See [Figure 7.10 Lane Closure with Temporary Signals](#) for details on site layout.

4.8.2 Portable Traffic Signals - Operational Guidelines

The operation of a portable traffic signal should consider:

- traffic volumes, including roadway and intersection capacity
- vehicle speeds
- work staging and operations
- sight distance restrictions
- affected side streets and driveways
- nature of adjacent land uses (e.g., residential or commercial)
- the use of pedestrian, cyclist, and/or custom user signal displays and/or audible signals
- signal phasing and timing requirements
- full-time or part-time operation
- actuated, fixed-time, or manual operation
- advance warning flashers
- power failures or other emergencies

The signal units should be powered by reliable power sources capable of operating the signals at all times unless traffic is controlled by Traffic Control Persons. The units may also be capable of communicating information remotely to traffic management personnel, such as errors or low battery levels.

Portable traffic signals shall be documented in the Traffic Control Plan and implemented in accordance with the standards specified in this Manual. Records shall be kept that identify placement, signal timing, inspection, and maintenance.

Drums should be placed on the approach side of the signals to provide notification and protection for road users, including cyclists.

Portable traffic signals that are not in use should be covered or removed.

Additional features to be included in a portable traffic signal system are:

- manual override to hold signal in green
- conflict monitor to ensure that the two signals in a pair cannot show green simultaneously
- ability to revert to flashing red mode if a fault is detected (i.e., low battery, lamp defect, lost communication, etc.)
- low-battery warning system, if applicable
- vehicle detection

Advance warning flashers are required where one or more of the following conditions apply (see also the Ministry's [Electrical and Traffic Engineering Manual](#), Section 400):

- visibility of the signal is obstructed because of vertical or horizontal alignment
- grade approaching the signal requires more than normal braking effort
- regular posted speed limit for the highway is ≥ 70 km/h
- Road Authority has requested advance warning flashers

The Traffic Signal Ahead C-112 sign should be used in accordance with [Appendix B: Standard Construction Signs](#).

Portable traffic signals should be inspected and logged at least once a day for:

- traffic operation (vehicle delay and throughput)
- signal alignment
- signal display failures
- power supply (battery life)
- signs of vandalism



C-112
Traffic Signal Ahead

If Class 2 portable signals will be used on a project, the Traffic Management Plan shall include:

- **Portable Traffic Signal Timing Plan** stamped by a Traffic Engineer.
- **Portable Traffic Signal Site Layout Plan** indicating the location of the site, position of the signals relative to the project site, distance between stop bars, distance between stop bars and advance warning sign (if applicable), location of vehicle-detection system, devices used to protect the signals, and other relevant information.

4.8.3 Portable Traffic Signal Timing Plan

When preparing the traffic signal timing sheets and supporting documentation for Class 2 traffic signals, refer to the Ministry’s Electrical and Traffic Engineering Manual, Section 400. Signal timing calculations for simple fixed-time setups are provided below.

Table 4.8: Fixed Timing for Class 1 Portable Traffic Signals

Length of Single Lane (m)	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360		
"All Red" Interval One Way (s)	2	4	6	9	11	13	15	17	19	22	24	26	28	30	32	35	37	39	41	43	45	47	50	52		
CYCLE LENGTHS (seconds)	150	810	785	760	725	700	675	650	625	605	570	545	520	495	470	450	415	390	370	345	325	300	275	245	220	
	140	800	775	750	710	685	660	635	610	580	545	520	490	470	445	420	380	360	335	310	285	260	235	200	175	
	130	795	765	735	695	670	640	610	585	560	520	490	465	440	410	385	345	320	290	270	240	215	195			
	120	785	755	725	680	650	620	590	560	535	490	460	430	405	375	345	305	275	250	220						
	110	775	740	710	660	630	595	565	530	500	460	425	395	360	330	300	255									
	100	760	725	690	640	600	570	535	500	465	415	380	345	315	285											
	90	745	710	670	615	575	540	500	460	420	365	330	295													
	85	740	700	660	600	560	520	480	440	395	340	305														
	80	730	690	645	585	545	500	455	410	370	315															
	75	725	680	630	565	520	475	430	385	340																
	70	715	670	620	545	500	450	405	360																	
	65	705	650	600	520	470	420	370																		
	60	695	635	580	495	440																				
	55	675	610	555	470																					
	50	660	595	530																						
	45	640	570																							
40	625																									

*Vehicles / Hour
on Heaviest Approach*

Notes:

1. Assumed operating speed of 25 km/h through the work activity area.
2. Minimum Green Time approximately 15 seconds.
3. Yellow Clearance Interval of 3 seconds.
4. Based on 50% probability of queue clearance.

Example:

Given: Heaviest Approach Volume (One Way) = 365 veh/h
Length of Single Lane Section = 150 m

Find: Length of Green Interval (One Direction)
Length of All Red Intervals

Solution: By applying the given figures to the table above, we find that:

Cycle Length = 90 seconds
All Red Intervals = 22 seconds

Since the Green Time for each approach is equal to the Cycle Length minus two All Red Intervals (22 sec) minus two Yellow Clearance Intervals (3 sec), divided by two, then:

Green Time for each approach = $\frac{90 - (2 \times 22) - (2 \times 3)}{2} = 20$ seconds

Class 2 Actuated Traffic Signal Timing Plan

PORTABLE TRAFFIC SIGNAL TIMING PLAN				
Date:	Location: Portable Signal on Somewhere Road, Somewhere City	Drawing: TE-00000-0	Project: 000/00000-1234	
Phase Settings	Direction A	Clearance A	Direction B	Clearance B
	Somewhere Road E/B		Somewhere Road W/B	
Minimum Green	10.0	13.0	10.0	13.0
Maximum Green	35.0	13.0	35.0	13.0
Passage	5.0	-	5.0	-
Yellow	4.0	-	4.0	-
All Red Clearance	1.0	0.00	1.0	0.00
Intersection Flash	RED	-	RED	-
Advance Warning Time	5.0	-	5.0	-
COMMENTS:				
Stop-bar to Stop-bar distance = 140 m				
Assumed Clearance Speed = 40 km/h				
Clearance Time for Direction A = 13 s				
Clearance Time for Direction B = 13 s				
Approach Speed = 60 km/h				
Approach Grade in Direction A = 0%				
Approach Grade in Direction B = 0%				
Stop-bar to Advance Warning Sign Direction A = 58 m				
Stop-bar to Advance Warning Sign Direction B = 58 m				
Controller rests in RED when no calls exist				

Example of Actuated Portable Traffic Signal Timing Calculations (Engineering Analysis Required)

Work Zone Characteristics:

Work zone length = 60 m
 Approach speed = 60 km/h = 16.7 m/s
 Assumed clearance speed = 40 km/h
 Grade = 0% (both approach directions)

Stop bar distance from work zone (west side) = 40 m
 Stop bar distance from work zone (east side) = 40 m

Therefore, stop bar to stop bar distance = 60 + 40 + 40 = 140 m

Portable Traffic Signal:

Select Max Green Time of 35 s 35 s is often a good starting point for Max Green Time. However, based on traffic volumes and local knowledge, the Traffic Engineer may adjust the Max Green Time to ensure that there is no undue vehicle delay.

$$\begin{aligned}
 \text{Clearance Time } R &= \frac{3.6D}{V} & \text{Where: } R &= \text{all Red Clearance Times (s)} \\
 &= \frac{3.6(140 \text{ m})}{40 \text{ km/h}} & V &= \text{travel speed through work zone (km/h)} \\
 &= 13 \text{ s} & D &= \text{distance between stop bars (m)}
 \end{aligned}$$

Yellow Time = 4 s

Passage Time of 5 s 3 to 5 s is often a good starting point for Passage Time. However, based on traffic volumes and local knowledge, the Traffic Engineer may adjust the Passage Time.

Advance Warning Flashers:

Distance (stop bar to advance warning flasher) = 58 m for 60 km/h approach speed and 0 % grade.

$$\begin{aligned}
 \text{Advance Warning Time} &= \frac{D+D_p}{V} & \text{Where: } D &= \text{distance of flasher to signal (m)} \\
 & & D_p &= \text{minimum perception distance} \\
 & & &= 21.3 \text{ m} \\
 & & V &= \text{posted speed limit (m/s)} \\
 &= \frac{58 \text{ m} + 21.3 \text{ m}}{16.7 \text{ m/s}} \\
 &= 5 \text{ s}
 \end{aligned}$$

Advance Warning Sign Distances

From the [Electrical and Traffic Engineering Manual](#) Section 402.6.10 Advance Warning Flashers:

		SIGN DISTANCE (m)					
		0.36 ⁽¹⁾	0.34 ⁽¹⁾	0.32 ⁽¹⁾	0.31 ⁽¹⁾	0.30 ⁽¹⁾	0.30 ⁽¹⁾
GRADE		50 km/h	60 km/h	70 km/h	80 km/h	90 km/h	100 km/h
D	-8%	49	71	100	132	170	207
	-7%	48	70	97	127	164	199
W	-6%	47	67	94	123	158	192
	-5%	46	66	91	119	153	185
H	-4%	45	64	88	116	148	179
	-3%	44	62	86	112	143	173
L	-2%	43	61	84	109	139	168
	-1%	42	60	82	106	135	163
	0%	41	58	80	104	131	159
U	+1%	41	57	78	101	128	155
	+2%	40	56	76	99	125	151
P	+3%	39	55	75	96	122	147
	+4%	39	54	73	94	119	143
H	+5%	38	53	72	92	116	140
	+6%	37	52	70	90	114	137
I	+7%	37	51	69	89	111	134
	+8%	36	50	68	87	109	131

⁽¹⁾ Friction factor

4.9 Lighting Devices

Lighting devices may be used in work zones when specified in this Manual or by the Road Authority. They may supplement channelizing devices, signs, and barriers, and/or be used to illuminate equipment or work activity areas.

4.9.1 Flashing Vehicle Lights

All work, buffer, and shadow vehicles stationed in or near travel lanes should be equipped with 4-way (emergency) flashers and 360-degree flashing yellow lights. They should be activated whenever a vehicle is positioned such that it could influence traffic.

4.9.2 Yellow Warning Lights

Yellow warning lights are portable yellow lights commonly used during night time hours to supplement other traffic control devices.

There are four types of yellow warning lights—Types A, B, C, and D. Types A and B should not normally be mixed when used in a series.



Figure 4.23: Type A & C Yellow Warning Light

- **Type A Low-Intensity** flashing warning lights may be used to supplement signs and channelizing devices such as barriers, barricades (particularly Type 1), and flexible drums, and for marking specific hazards and outlining long-duration work activity areas.
- **Type B High-Intensity** flashing warning lights are used during daylight and night-time hours. They operate 24 hours per day and may be mounted on advance warning signs or on independent supports. They may also be used on barricades, barriers, and channelizing devices if they can be dimmed during night-time use to reduce driver sensitivity to brightness.
Type B lights should be **visible for at least 300 metres** in clear **daylight** conditions. Flags may be substituted for Type B lights in day-time applications.
- **Type C Steady-Burn and Type D 360-Degree Steady Burn** warning lights may be used to supplement delineation of the edge of the roadway where multiple devices are used. They may also be used to delineate a work activity area or to run along the edge of a closed lane or shoulder. When used to delineate a curve, they should be used only on devices on the outside of the curve.



Figure 4.24: Type D Yellow Warning Light

All light types should be **visible for at least 900 metres** under clear night-time conditions.

Warning lights may be mounted on signs or channelizing devices and shall be secured in such a manner that they are unlikely to penetrate the windshield if hit by an errant vehicle.

Warning lights can operate in either flashing or steady-burn mode:

- Flashing warning lights are not to be used for delineation because a series of flashers operating randomly does not identify the desired vehicle path.
- For tapers, a series of sequential synchronized flashing warning lights or steady burn flashers may be placed on channelizing devices in order to increase driver detection and recognition.
- If a series of sequential flashing warning lights is used, the successive flashing should occur from the upstream end to the downstream end of the taper in order to identify the desired vehicle path.
- Each flashing warning light in a sequence should be flashed at a rate no less than 55 times per minute and no more than 75 times per minute.

4.9.3 Roadway Lighting

Consider the temporary installation of luminaires at key locations in very long-duration work zones. Areas that may benefit from the installation of roadway lighting include:

- project staging areas
- road hazards (e.g., structure encroachments)
- crossovers
- diversions (bypasses)
- areas with sudden alignment changes
- curves
- intersections
- transitions from multilane divided roadways to two-lane, two-way roadways

4.9.4 Overhead Lighting

Overhead lighting includes floodlights, balloon lights, and existing street lighting. When work is performed at night, overhead lighting should be used to illuminate the work activity area, equipment crossings, and other potentially hazardous areas. Overhead lighting is not a substitution for the need for retroreflectivity on signs and devices.

Except in emergency situations and for mobile operations, each Traffic Control Person location shall be illuminated at night by overhead lighting. More information can be found in [Section 5.4.1 TCP Apparel and Equipment](#).

The adequacy of overhead lighting placement and glare elimination should be determined by driving through and observing the lit area at night—from each direction on all approaching roadways—both after the initial overhead lighting is set up and periodically thereafter.

Floodlights may have to be shielded or repositioned to prevent glare. Floodlighting of some areas may decrease relative visibility in other areas, and it may be necessary to define intended vehicular paths with other devices, such as strings of steady-burn yellow warning lights.

4.9.5 Equipment Lighting

Equipment lighting is critical for the visibility of equipment on the road and in work activity areas. LED lighting is becoming the preferred lighting option for equipment. Other lighting options are still acceptable.

All powered mobile equipment shall be equipped with lighting to ensure that it is visible to drivers, pedestrians, and workers. Equipment lighting requirements include 360-degree flashing lights and 4-way yellow flashing lights or equivalent for 360-degree visibility.

Other visibility devices that may be used or required on work zone equipment include:

- retroreflective striping
- equipment-mounted lamps for localized area lighting
- multiple lights mounted around equipment to light the work activity area

To reduce glare, balloon lighting may be used for lighting equipment. It can also be effective for night-time paving operations.



Figure 4.25: Balloon Lighting

4.10 Fencing and Screens

4.10.1 Work Zone Fencing

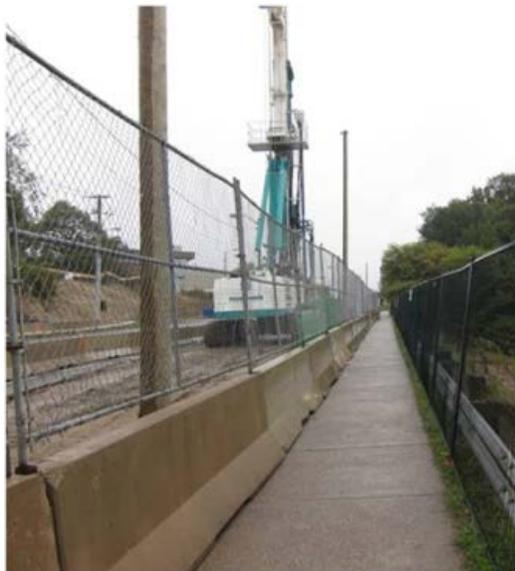
Work zone fencing can be used to:

- identify the work area
- protect the public from the work area
- protect the work area from road users
- mark the edge of work zones
- identify the travel path for drivers, cyclists, and pedestrians



Removable Chain Link Panels

Snow Fence with Retroreflective Stripes



Chain Link Panels on Concrete Roadside Barrier

Figure 4.26: Work Zone Fencing

4.10.2 Work Zone Screens and Barrier Screens

In long-duration work zones on multilane highways where median and roadside work activities may impact traffic operations and cause delays, screens are useful for blocking the road user's view of activities, which can be distracting.

Screens may further improve safety and traffic flow by reducing headlight glare from oncoming vehicle traffic.

Screens may be mounted on the top of temporary traffic barriers that separate two-way vehicle traffic. They shall not be mounted where they might adversely affect vehicle operations or driver sight distances.

4.11 Other Traffic Control Devices

4.11.1 Flags on Traffic Control Devices

Flags are used to enhance the daylight visibility of certain traffic control devices in speed zones of 70 km/h or higher. They are fluorescent red or orange squares at least 40 cm x 40 cm (16" x 16") in size. They are not required for night work because their effectiveness is limited by poor lighting conditions. Flags used on signs during the day may be replaced with Type A flashing lights at night.

Flags should be used in pairs and positioned so as not to interfere with the visibility of the sign messages. They shall not be used by Traffic Control Persons to direct traffic.

Flags are used on signs that warn of day-time workers on or adjacent to a roadway with regular posted speed limits ≥ 70 km/h:

- Traffic Control Person Ahead C-001-1
- Survey Crew Ahead C-003
- Crew Working Ahead C-004
- Accident Scene C-058

Flags should generally be used only on the signs listed above, which relate directly to the presence of workers. They may also be used on other signs that require additional emphasis—for example, layouts requiring few signs but covering long distances (mowing, line markings, etc.).

- Note:**
1. Flags should not be used on all signs in a sign series because overuse reduces the emphasis and effectiveness of key signs.
 2. Flags should not be used on speed limit signs.

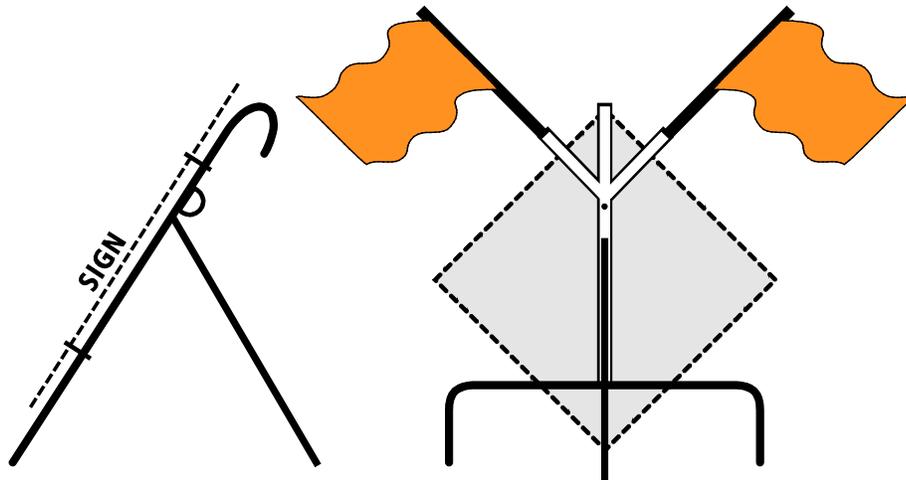


Figure 4.27: Pair of Flags on Sign

4.11.2 Sand Bags/Weights

Sand bags/weights may be used in work zones to support and/or stabilize the base area of signs and channelizing devices. Windy areas, higher-speed roadways, and narrow and sloped areas impact the stability of traffic control devices. The weights should be placed near the road surface where they cannot become projectiles.

Sand bags shall not be used as a channelizing device.

4.11.3 Speed Reader Boards

Speed reader boards (SRB) are electronic changeable speed display signs capable of detecting and displaying the speed of approaching vehicles in real-time via radar speed detection. SRB come either as trailer mounted units or pole mounted units. SRB may be used for:

- long-duration work zones (i.e., night-time work or more than one day-time shift)
- work zones that use Traffic Control Persons
- highway projects when stipulated by provisions in the project documents

1. Deployment Guidelines

1. SRBs should be positioned downstream of the regulatory speed sign to affirm a construction speed zone.
2. SRBs are placed approximately 100 to 200 metres in advance of the work activity area.
3. When used in advance of Traffic Control Person setups, the location of the speed reader board should follow the placement guidelines illustrated in [Figure 4.29 A: Long-Duration Lane Closure with TCPs and Speed Reader Boards – Two-Lane, Two-Way Roadway](#).
4. On multilane highways, speed reader boards should not be placed close to merge areas and ramp areas.
5. Where work zones are divided into several work activity areas or are more than 1500 metres long, two or more speed reader boards may be used (per direction) to reaffirm and maintain speed reductions, separated by at least 300 metres.
6. Speed reader boards should be inspected for sight lines and for shadowing created by structures or construction signs to ensure sign visibility and effective operation.
7. A speed reader board should be delineated/protected using drums or tube markers/ delineators, with at least three markers/delineators on the upstream side of the speed reader board.

2. Operational Guidelines

1. SRB should include the words YOUR SPEED or similar text, together with the numeric electronic display. The text may be non-electronic.
2. SRB shall be in operation only when the construction speed limit is in effect and workers are present on the roadway.
3. The speed reader board shall be programmed in relation to the construction speed limit.
4. If no vehicles are approaching the speed reader board, the display should be blank.
5. The electronic display may be programmed to flash and/or display the message SLOW DOWN when the vehicle speed exceeds 10 km/h over the speed limit. It shall not flash for speeds less than 10 km/h over the speed limit. The flash rate shall be a maximum of 50 cycles per minute. Strobe-type light enhancements are not permitted.
6. When the vehicle speed exceeds 40 km/h over the speed limit, the numeric display should be programmed to go blank or display the message SLOW DOWN.
7. The radar in the speed reader board should detect an approaching vehicle no more than 10 seconds before the vehicle reaches the radar unit's position. Detection should not occur until the vehicle has entered the construction speed zone.



Figure 4.28: Speed Reader Board

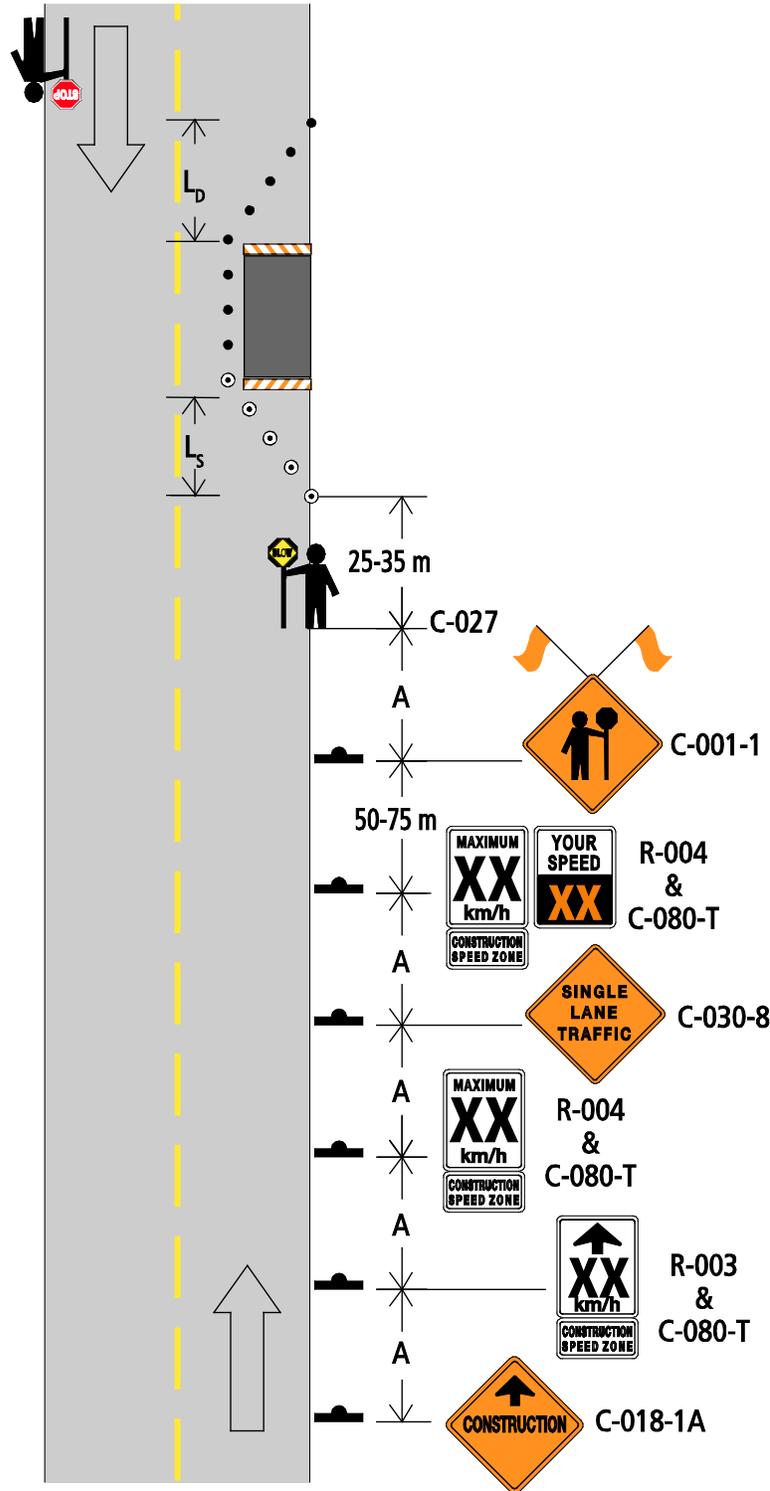


Figure 4.29 A: Long-Duration Lane Closure with TCPs and Speed Reader Boards – Two-Lane, Two-Way Roadway

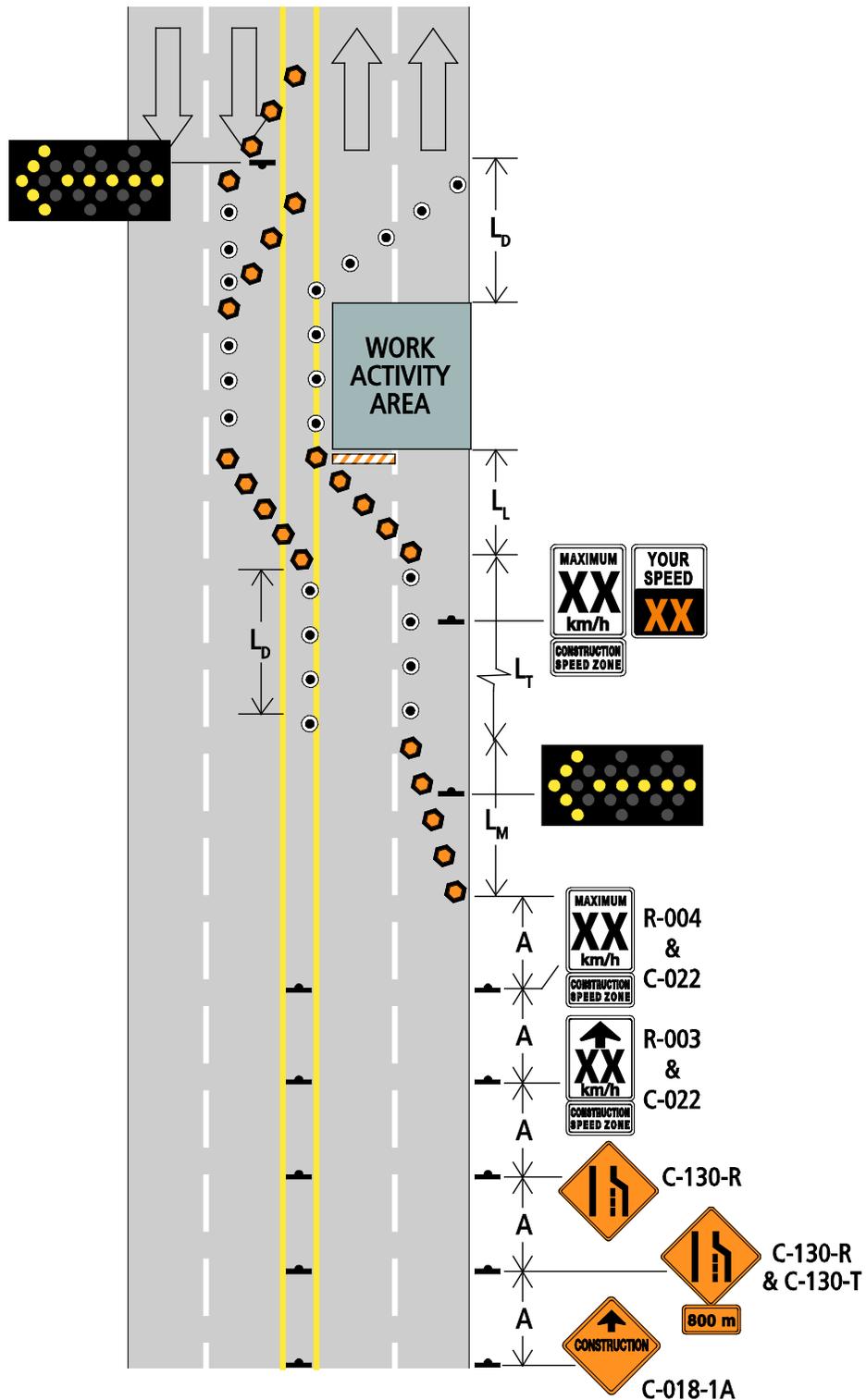


Figure 4.29 B: Freeway/Multilane Median Crossover with Speed Reader Board

4.11.4 Temporary Rumble Strips

Temporary rumble strips may be used to alert road users to a changing roadway environment that requires extraordinary caution. They may also be used as an audible vehicle detection system for workers adjacent to the roadway.

They are surface placed, raised strips, which are placed perpendicular to the direction of travel. When a vehicle passes over the strips, the noise and vibration draw the driver's attention to features such as signs, unexpected alignment changes, or potential stop conditions.

Installation Guidelines:

1. Spacing between temporary rumble strips should be 3.0 m, and their width should extend across the travel lane. A sign warning drivers of the rumble strips should be placed in advance of the installation (see [Figure 4.31: Layout of Temporary Rumble Strips](#)).
2. Temporary rumble strips may be white, yellow, black, or orange, and contrast the colour of the roadway.
3. Temporary rumble strips should be placed sufficiently in advance of the condition to allow road users to respond to the warning.
4. Temporary rumble strips should not be placed:
 - within intersections
 - through pedestrian crossings
 - on sharp horizontal or vertical curves
 - within marked bicycle lanes or on roadways used by cyclists unless a clear path at least 1.0 m wide is provided at each edge of the roadway or on each paved shoulder



Figure 4.30: Temporary Rumble Strips

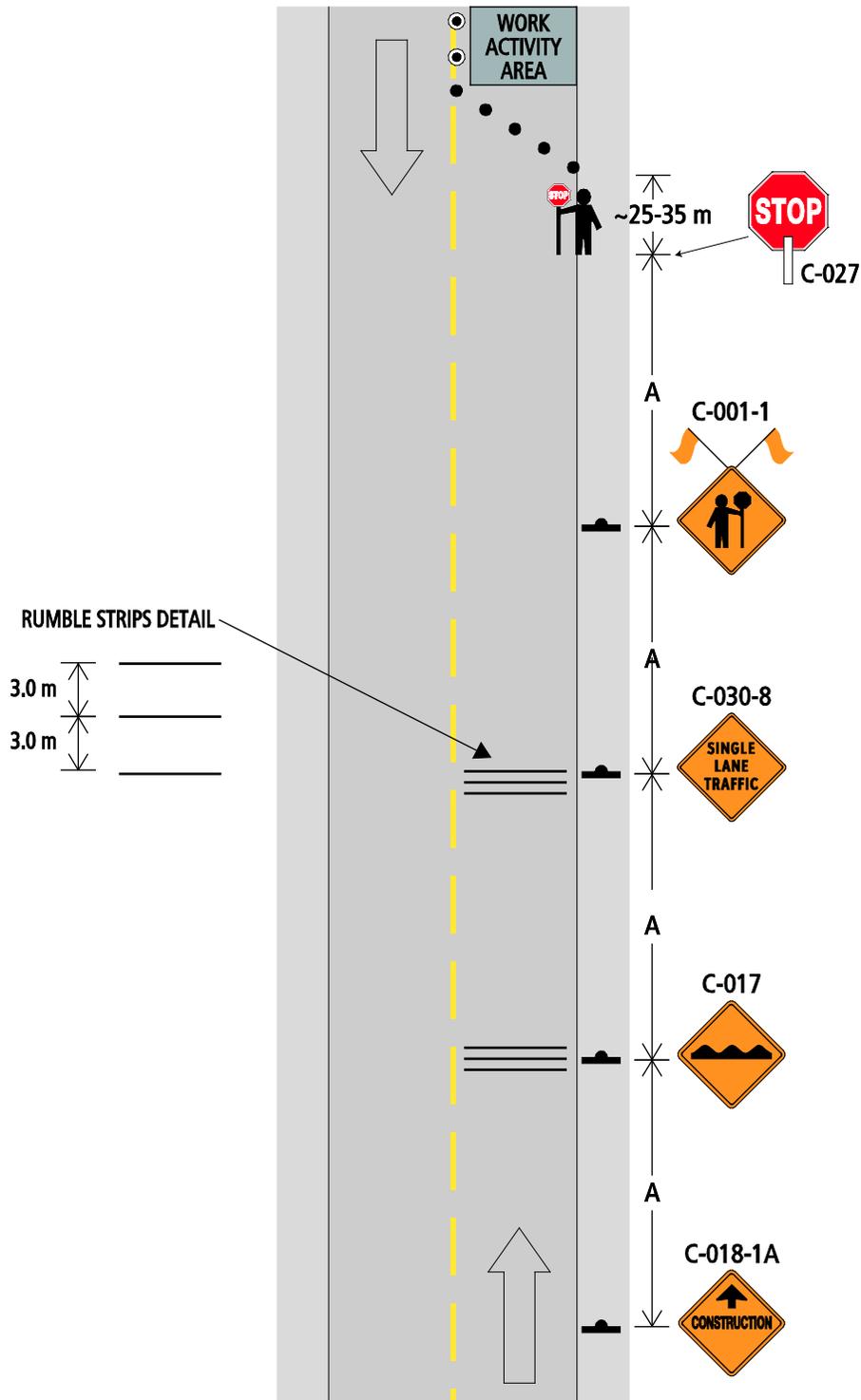


Figure 4.31: Layout of Temporary Rumble Strips

4.11.5 Shadow Vehicles

Shadow vehicles are used to provide mobile advance warning for operations where a work vehicle blocks or encroaches into a travel lane that has not been closed to traffic.

There may be more than one shadow vehicle for a continuously-moving work zone, with one shadow vehicle positioned as far as possible onto the shoulder (left or right) in advance of the work vehicle. Two shadow vehicles are typically required on multilane divided roadways with speeds ≥ 70 km/h. The shadow vehicle operator(s) and the work vehicle operator should be in communication with one another.

Operations where shadow vehicles may be used include, but are not limited to:

- pavement marking and striping
- hydro-seeding
- sweeping
- flushing
- pothole patching
- mowing

The factors involved in determining the requirement for shadow vehicles include:

- exposure of workers to traffic
- speed of traffic relative to speed of work vehicle
- traffic volumes and number of lanes
- highway classification
- shoulder width
- sight distance
- weather conditions

Shadow vehicle distances should be adjusted for horizontal and vertical curves so that the vehicle is clearly visible to traffic approaching the curves. The distance between shadow vehicles and working equipment may require periodic adjustment to prevent drivers from crossing or driving into the lane between the shadow vehicle and the work area or equipment.

Shadow vehicles shall be equipped with a flashing arrow board (FAB) and a 360-degree flashing yellow light and 4-way flashers. If a flashing arrow board is used on a two-lane, two-way roadway, it should show only a non-directional warning display. It shall never display an arrow that directs traffic into a lane that could be occupied by opposing traffic.

The shadow vehicle may be equipped with a rear-mounted crash attenuator. This may be required for specific types of work activities for certain highway classifications, or as specified by the Road Authority. Vehicle-mounted crash attenuators are often used on shadow vehicles in mobile, high-speed (≥ 70 km/h) operations.

4.11.6 Buffer Vehicles

Buffer vehicles are stationary vehicles used to protect workers from errant vehicles in an active work area. The buffer vehicle is parked upstream of the workers. The wheels should be pointed in a direction that will help to prevent the vehicle from entering the work activity area or travel lanes if it is struck.

Buffer vehicles shall be equipped with a 360-degree flashing yellow light and 4-way flashers, or a flashing arrow board (FAB). They may also be equipped with vehicle-mounted crash attenuators to reduce the effect of a collision.

4.11.7 Vehicle-Mounted Crash Attenuators

Vehicle-mounted crash attenuators are energy-absorbing devices attached to the rear of shadow vehicles, buffer vehicles, or trailers to help protect workers or equipment from errant vehicles. Their energy-absorption properties help to reduce crash severity.



Figure 4.32: Trailer-Style Crash Attenuator

Vehicle-mounted crash attenuators may be used in many applications that require a buffer vehicle or additional protection for workers and the work zone. They are often used on shadow vehicles in mobile, high-speed (≥ 70 km/h) operations. The Road Authority may define in the contract those situations that require their use.



Figure 4.33: Vehicle-Mounted Crash Attenuator

4.11.8 Temporary Crash Attenuators on Barriers

Crash attenuators—also known as crash cushions or impact attenuators—are systems that absorb energy when struck by an errant vehicle, either through deceleration or deflection. These devices reduce the effects of crashes from the exposed ends of barriers, bridge piers, fixed objects, and other obstacles. Detailed crash attenuator information is available in the [American Association of State Highway and Transportation Officials' \(AASHTO\) Roadside Design Guide](#).

Requirements for the use of temporary crash attenuators are defined in the Ministry's special provisions for highways projects, or by the Road Authority.

1. Crash attenuators used on Provincial highways shall meet the current American Association of State Highway and Transportation Officials (AASHTO) [Manual for Assessing Safety Hardware](#) (MASH) unless otherwise specified by the Road Authority .
2. Unless otherwise approved by the Road Authority, the selected test level shall match the original or intended regulatory speed at which the highway will operate when the work zone is removed.
3. Crash attenuators should be inspected periodically to verify that they have not been hit or damaged. Damaged crash attenuators shall be repaired or replaced to maintain their crash-worthiness.
4. For Ministry projects, the Regional Traffic Engineer will assess the need for crash attenuators based on several factors. These include, but are not limited to:
 - speed
 - highway classification
 - number of lanes
 - volume
 - geometrics
 - site constraints
 - obstacle to be protected

4.11.9 Pilot Cars for Work Zones

Section 4.11.9 deals with pilot cars that are used to guide traffic through construction zones and work areas.

For information on piloting extraordinary loads, see the following:

- [Appendix G: Pilot Car Load Movement Guidelines](#)
- Division 8 (Pilot Cars and Signs) in the *Commercial Transport Regulations*
http://www.bclaws.ca/civix/document/id/complete/statreg/30_78
- Chapter 8 of the *Commercial Transport Procedure Manual*
<https://www2.gov.bc.ca/assets/gov/driving-and-transportation/cvse/commercial-transportation-manual/chapter-8.pdf>

For the purposes of this Manual, a pilot car is a vehicle marked with warning signs and lights that is used to guide a queue of vehicles through a work zone or detour regulated by Traffic Control Persons or by temporary signals for which the pilot car operator has full control of the signal operation. The length and complexity of the work zone makes navigation difficult for drivers. (e.g., where there is a substantial change in alignment).

When deciding whether or not to use a pilot car operation, it is important to consider the type of work, traffic volume, road alignment, and access points within the work zone.

A pilot car should have four or more wheels, seating for two or more persons, and be capable of transporting pedestrians or cyclists through the work zone.

1. Communication with Stakeholders

It is important to communicate with the affected stakeholders when initiating a pilot car operation in an area with accesses and driveways via:

- written notification of the dates and times when work will take place
- written instructions for safely joining and leaving the traffic stream when entering and leaving the location of the business, residence, or institution
- contact information for the Prime Contractor

2. Planning and Operations

The plan to use a pilot car should be assessed before the project commences, taking into account the nature of the work zone. For example, if there are complex access issues, a strategy should be developed for keeping track of vehicle entries and departures from the queue.

A pilot car shall be operated in a manner that ensures the highest level of safety for road users and workers.

The travel speed should not permit gaps to develop between the vehicles being led, and should not contribute to tar splatter or the creation of dust in the work zone.

Traffic Control Persons and pilot car operators should remain in radio communication throughout the work zone, with Traffic Control Persons regulating traffic:

- at each end of the work zone
- at every intersection that may require it between Traffic Control Persons
- at every other location where needed to ensure safety
- when an assessment dictates it, at every business access location that routinely has customers stopping between the primary Traffic Control Persons at either end of the pilot car zone

3. Pilot Car Warning Lights

4-way flashers and 360-degree rotating yellow warning lights shall be used on pilot cars. Warning lights should be directly wired to the vehicle's electrical system. Arrow sticks are an acceptable alternative to the 360-degree rotating yellow warning lights.

The lights should be used only when the pilot car is operating.

4. Pilot Car Signs

The Pilot Car C-048-1-DS sign is usually double-sided and should have the words PILOT CAR on one side for approaching vehicles and PILOT CAR – DO NOT PASS on the other side for following vehicles. The sign should be positioned on the pilot car so that it is visible to drivers of vehicles approaching from both directions, and shall be kept in a vertical position to ensure good viewing from both directions.

Pilot cars may use two separate signs with the same messaging indicated above. Another option is the Pilot Car C-048-2 sign, which displays PILOT CAR on both sides and fits within manufactured overhead racks.

Shoulder-mounted FOLLOW PILOT CAR signs should be positioned so that approaching drivers are notified of the pilot car operation. Additional FOLLOW PILOT CAR signs may be required so that signs are positioned beyond the end of the expected or known vehicle queues resulting from pilot car operations.



C-049-x
900 x 900 mm



C-048-1-DS
1200 x 900 mm



C-048-2
1830 x 305 mm



Figure 4.34: Pilot Car Signs

5. Pilot Car Radio Communications

Pilot cars should have an electronic device that allows all pilot car operators and all Traffic Control Persons to communicate effectively with each other over the length of the pilot car operation.

Communications should be on the same channel or frequency, and should be switched on at all times during pilot car operations.

6. Pilot Car Traffic Control

Pilot car operators are not authorized to direct traffic. Their role is to guide traffic through a work zone once that traffic has been directed to follow them by an authorized Traffic Control Person. Pilot car operators may also position their vehicles to control vehicle access to the work zone.

If a pilot car operator is to carry out Traffic Control Person operations, that operator shall first be trained as a Traffic Control Person in a manner that is acceptable to WorkSafeBC, and shall perform Traffic Control Person duties in a manner that complies with WorkSafeBC and Road Authority requirements.

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PART B – TRAFFIC CONTROL

Section 5: Traffic Control Persons (TCPs)

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PART B – TRAFFIC CONTROL

Section 5: Traffic Control Persons (TCPs)

5.1 Roles and Responsibilities

For information on management responsibilities related to traffic control, see [Section 1.2: Road Authority and Prime Contractor Responsibilities](#).

5.1.1 Traffic Control Supervisor

The Prime Contractor shall designate a Traffic Control Supervisor who is qualified to assume the responsibilities of this function. It cannot be the Site Supervisor, Superintendent, or Foreman unless the designation is authorized by the Road Authority.

The Traffic Control Supervisor may be an employee of the Prime Contractor or a sub-contractor to the Prime Contractor. It may be the Traffic Control Manager for the project or an onsite Traffic Control Person if circumstances allow. If the traffic management responsibilities for the project require full-time or frequent attention, a different person should be assigned to this role.

In general, the Traffic Control Supervisor is responsible for the following:

- oversee traffic control operations, ensuring traffic control is executed in accordance with the Traffic Control Plan, and updated as necessary.
- ensure compliance with Part 18 of WorkSafeBC's Occupational Health and Safety Regulation regarding supervision of Traffic Control Persons in the work zone
- provide direction to Traffic Control Persons
- required traffic control devices are in place
- signs are checked, maintained, and moved as required
- daily traffic control setups are documented, and changes are identified in the Traffic Control Plan or log book
- traffic concerns are reported to the Traffic Control Manager or Site Supervisor
- each member of the traffic control crew wears the required personal protective clothing and equipment (see [Section 5.4: Work Zone Apparel and Equipment](#))

The Traffic Control Supervisor shall also ensure that all TCPs are:

- carrying evidence of current TCP certification
- equipped with all necessary equipment, including, radios, spare batteries, chargers, and red signalling wands
- performing traffic control duties competently and safely
- positioned in safe locations that are clear of potential environmental hazards, such as a slide or avalanche
- provided with rest breaks

If two or more TCPs work as a team, the employer of the traffic control personnel and the Traffic Control Supervisor should ensure that the responsibility for coordinating changes in traffic flow is assigned appropriately. The Traffic Control Supervisor shall have TCP certification in order to assume the duties of a TCP and direct traffic.

5.1.2 Traffic Control Persons (TCPs)

Depending on the project category and complexity, and in collaboration with the Prime Contractor, TCPs may be required to prepare, review, amend, and document Traffic Control Plans as part of their daily activities. In order to do so, they shall carry valid TCP certification on the work site at all times, and have a good working knowledge of this Manual.

TCPs shall communicate instructions and directions to drivers effectively by using standard traffic control motions and signals that are precise and deliberate to be clearly understood by road users.

TCPs quickly become familiar with their work zone, and should try to assess the layout through the eyes of a road user who is arriving at the zone in the worst foreseeable conditions. This will help them to anticipate traffic control issues and identify required changes to the Traffic Control Plan.

TCP training and performance should emphasize:

- the importance of the job
- alertness and attentiveness
- the need for a courteous but firm manner
- proper TCP positioning in relation to the work activity area in order to achieve effective traffic control and ensure the safety of the public, workers, equipment, and all TCPs
- sufficient discipline to prevent others from loitering near the TCP location
- sufficient discipline to remain in position until relieved by other personnel or until the conflict being controlled no longer exists
- the requirement to remove or cover Traffic Control Person Ahead C-001-1 signs whenever TCPs are not actively regulating traffic
- the requirement to comply with Part 18 of WorkSafeBC's Occupational Health and Safety Regulation regarding personal protective equipment (see [Section 5.4: Work Zone Apparel and Equipment](#)) and traffic control signals (see [Section 5.6: TCP Positioning and Signals](#))

Among other requirements specified in Part 18 of WorkSafeBC's Occupational Health and Safety Regulation, employers and supervisors should ensure that:

- Traffic control arrangements and procedures for the work are made known to all personnel involved in the work.
- Required traffic control devices and procedures are in place before the work starts and are removed when they are no longer required.
- Any person assigned to be a TCP is adequately trained in a manner acceptable to WorkSafeBC, and performs effectively in accordance with the traffic control arrangements and procedures for the work.

5.2 Use of TCPs in Work Zones

TCPs are used only when all other traffic control methods are considered inadequate to warn, direct, and regulate road users within a work zone.

TCPs are used to direct traffic within a work zone, thereby preventing conflicts between the movements of pedestrians, vehicles, workers, and work zone equipment.

TCPs shall not control traffic within speed limits greater than 70 km/h.

Common applications for TCPs include:

- control of alternating one-way traffic through sections of a two-way road that is temporarily reduced to one lane (single lane alternating traffic or SLAT)
- stopping public traffic to permit equipment to cross or enter onto a road, structure, or other work zone feature
- providing information to drivers or pedestrians regarding road closures, wait times, route options, etc.

One or both TCPs may be omitted in the following situations:

1. The self-regulated section does not extend through an intersection.
2. Where an open, one-lane section is sufficiently short (e.g., a spot obstruction), sight distance is adequate, and traffic volumes are light.
 - If one TCP is omitted, the Traffic Control Person Ahead C-001-1 signs remain to warn of the one TCP ahead.
 - If both TCPs are omitted, the Traffic Control Person Ahead C-001-1 signs are removed and a Yield To Oncoming Traffic R-056 sign is posted in the closed lane or the lane affected by the works.
3. A temporary traffic signal may be used instead of TCPs to control traffic on sections of one-lane, two-way roadways (see [Section 4.8: Temporary and Portable Traffic Signals](#)).
4. TCPs are not generally required as a traffic control measure for reducing speed or for reducing the number of lanes on multilane roads.

5.3 Minimum Requirements for TCPs

5.3.1 Physical and Mental Requirements

TCPs should be physically and mentally prepared to do the required work, and should exhibit these characteristics:

- good vision
- good hearing
- alertness and mature judgement
- intelligence and common sense
- pleasant, cooperative disposition
- sense of responsibility for the safety of workers and the public

5.3.2 Training and Certification

TCPs shall receive approved training, pass an examination, and be certified before they are assigned to work within a work zone.

TCPs shall:

- have valid proof of training or certification issued by a recognized training agency as determined by WorkSafeBC
- carry their certification at all times while on the job
- present their certification to the appropriate authorities on demand

TCPs should have these proficiencies:

- knowledge of vehicle operations, such as stopping distances, turning radii, etc.
- knowledge of basic regulatory requirements governing drivers
- understanding of basic traffic signs and the rules of the road
- understanding of driver expectations

A Class 5 driver's licence may help to provide information about these proficiencies.

5.4 Work Zone Apparel and Equipment

5.4.1 TCP Apparel and Equipment

Personal protective clothing and equipment for TCPs shall comply with Parts 8 and 18 of WorkSafeBC's Occupational Health and Safety Regulations and other standards as identified below.

1. Basic Requirements

TCPs shall have the following required material with them on the job at all times:

- **STOP or SLOW C-027 Paddle:** An extension pole that is 1.3 to 2.1 metres long is optional.
- **Traffic Control Person Ahead C-001-1 Sign:** The sign shall be removed or covered when TCPs are not actively controlling traffic.
- **Safety Headgear:** TCP hard hats shall comply with one of these standards:
 - Current CSA Standard CAN/CSA-Z94.1 Industrial Protective Headwear
 - Current ANSI Standard Z89.1, American National Standard for Personnel Protection – Protective Headwear for Industrial Workers Requirements
 - Current Japanese Industrial Standard JIS T 8131, Industrial Safety Helmets for Class AB or ABE Headgear

Hard hats shall be of a **high-visibility colour** with a band of retroreflective tape across the top from front to back and on the sides.

 - WorkSafeBC permits fluorescent yellow-green, fluorescent orange-red, and fluorescent red colours.
 - The hard hat shall have retroreflective material across the top from front to back and on the sides to make it clearly visible to drivers approaching from any angle.
- **Safety Footwear:** TCP footwear shall be CSA-compliant Grade 1 safety footwear (green triangular CSA patch on the outside, green rectangular label on the inside).
- **Safety Apparel:** TCPs shall wear Class 3 garments that comply with both the current CSA Z96 standard and Section 18 of WorkSafeBC's Occupational Health and Safety Regulation.

See also [Section 5.4.2: Apparel Retroreflectivity for TCPs](#).



Figure 5.1: C-027 Traffic Control Paddle STOP or SLOW – Double Sided

2. Day-Time and Night-Time Apparel

Alternative to coveralls shown, TCPs may wear a combination of a torso vest (or jacket) and bands encircling both arms and both legs.

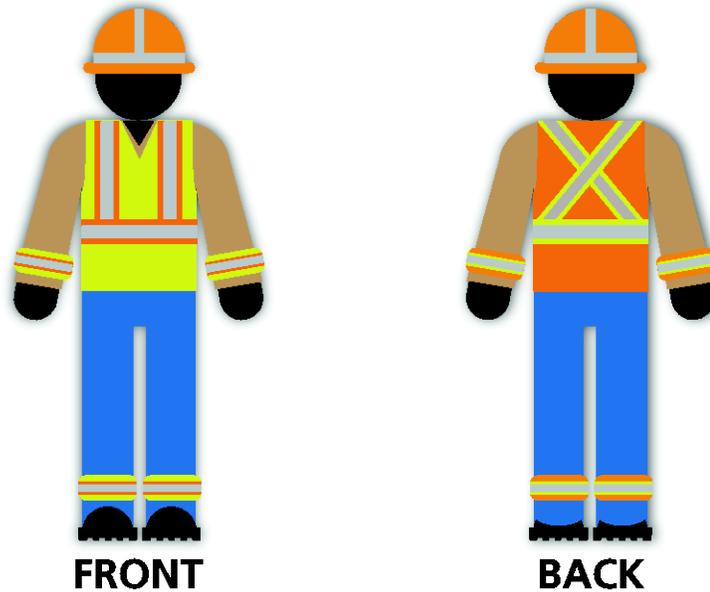


Figure 5.2 A: TCPs with Fluorescent Yellow-Green and Fluorescent Orange-Red Vests

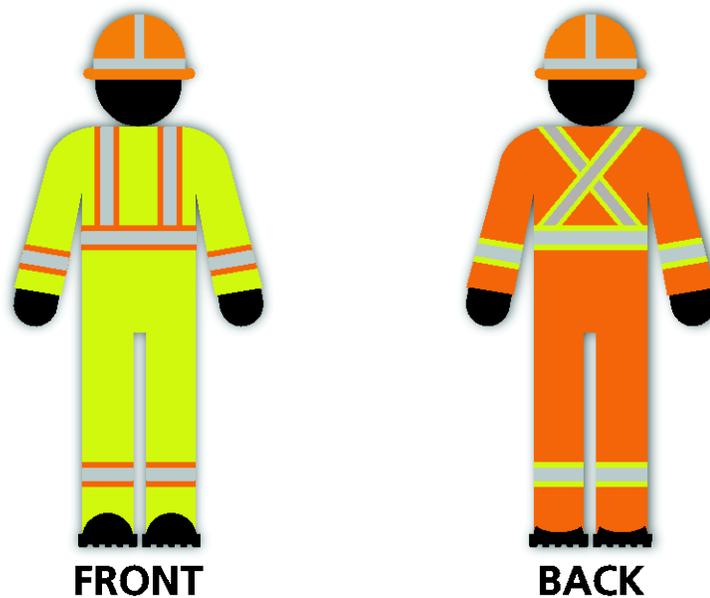


Figure 5.2 B: TCPs with Fluorescent Yellow-Green and Fluorescent Orange-Red Coveralls

3. Additional Requirements for Night Operations

- flashlight with red signalling wand
- spare batteries
- two-way radios

4. Night Lighting

TCP stations shall be illuminated at night. If street lighting is available, TCPs should stand below the light to maximize front-of-body illumination. If temporary overhead lighting is being used, it shall not subject approaching drivers to excessive glare.

5. Optional Equipment

- CSA-approved safety sunglasses or eye protection where required
- rain gear meeting Class 3 retroreflectivity requirements

6. Lettering and ID Patches

Lettering and ID patches that are not retroreflective may be placed on the garment, provided that they do not cover an area greater than 105 cm² and do not cover any part of the mandatory retroreflective stripes/bands.

Retroreflective lettering or ID patches that meet the requirements of the current CSA Z96 standard shall not cover an area greater than 500 cm² and may be placed anywhere on the garment as long as the positioning does not obscure the recognizable pattern of the stripes/bands.

Note: For work on Provincial roadways, the Ministry has adopted a high-visibility standard for worker apparel that exceeds WorkSafeBC's retroreflectivity standard.

This standard provides both adequate retroreflectivity and contrasting colour, and applies to all workers on all Ministry projects.

5.4.2 Apparel Retroreflectivity for TCPs

TCPs shall wear Class 3 safety garments that comply with the current CSA Z96 standard and the WorkSafeBC requirement. At minimum, Class 3 high-visibility material shall fully cover the upper torso (front, back, sides, and over shoulders) and shall include bands encircling both arms and both legs.

Acceptable colours for background material on these high-visibility safety garments are **fluorescent yellow-green** and **fluorescent orange-red** (the orange-red is often labelled fluorescent orange).

These garments require a **contrasting-colour fluorescent** stripe that is at least 100 mm (4") wide. Acceptable colours for the contrasting stripe are also fluorescent yellow-green and fluorescent orange-red. The retroreflective bands used on these garments shall be at least 50 mm (2") wide and in a colour that contrasts with the background colour.

Horizontal wrist and ankle stripes/bands shall be placed on the sleeves and pants, encircling both arms and legs. They shall be 100 mm (4") wide and include a 50 mm (2") retroreflective band with two 25 mm (1") contrasting colour fluorescent stripes on each side of the retroreflective band.

The stripes/bands shall be laid out in this pattern:

- symmetric X on back of garment extending from shoulders to waist
- two vertical stripes/bands on front extending over shoulders and down to waist
- horizontal leg and arm stripes/bands encircling both arms and both legs.
- waist-level, horizontal stripe/band extending entirely around the circumference of the torso from the back to the bottom of the vertical stripe/bands on the front, where they end at the front fastening mechanism (snap, zipper, etc.)
- gaps in retroreflective materials for front fastening cannot exceed 50 mm (2")



Figure 5.3: Coveralls with Contrasting Retroreflective Bands

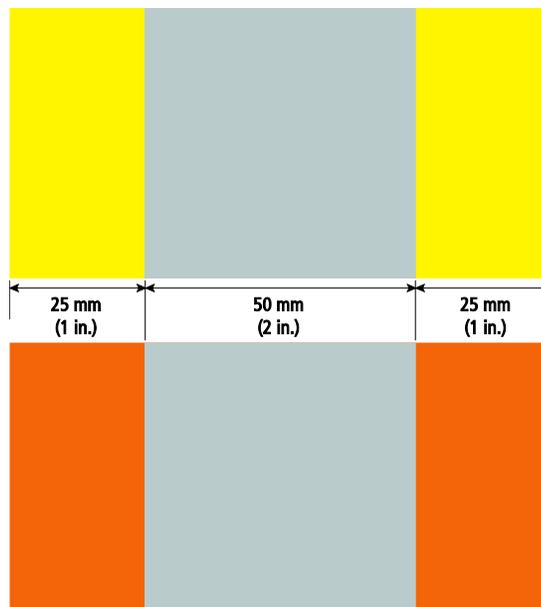


Figure 5.4: Retroreflective Striping Cross Sections and Dimensions

5.4.3 Apparel for Other Onsite Workers

Work zone workers who are not TCPs shall wear Class 2 safety garments that comply with both the current CSA Z96 standard and the WorkSafeBC requirement.

At minimum, Class 2 high-visibility material shall fully cover the upper torso (front, back, sides, and over the shoulders).

For work on Ministry right-of-way, onsite workers shall wear safety garments that comply with the standards outlined in this Manual, the current Z96 standard, and current WorkSafeBC Part 8 requirements.

The following apparel components shall also comply with the retroreflectivity requirements for TCPs (see [Section 5.4.2: Apparel Retroreflectivity for TCPs](#)):

- fluorescent background material
- fluorescent 100 mm (4") contrasting stripe
- 50 mm (2") retroreflective bands of tape



Figure 5.5: Worker Vests with Contrasting Retroreflective Bands (Day-Time Apparel for TCPs)

Note: For work on Provincial roadways, the Ministry adopted standard outlined above for work apparel exceeds WorkSafeBC's standard.

This standard provides both adequate retroreflectivity and contrasting colour, and applies to all workers on all Ministry projects.

5.4.4 Apparel Labelling for All Onsite Workers

Garment labels should include these details to comply with the current CAN/CSA Z96 standard:

1. Manufacturer or authorized representative name, trademark, or other form of identification.
2. Designation of the product type (i.e., Coverall), commercial name, or code.
3. Size designation.
4. CSA Z96.
5. Apparel Class and Level of Performance for the retroreflective material.
6. Indication that background material is fluorescent.
7. Indication of Flame Resistant (FR) Performance if applicable.



Figure 5.6: Manufacturer's Label

5.5 TCP Communications

5.5.1 Fundamental Principles

TCPs work together to regulate traffic through the work zone. This means that they need to communicate effectively with each other.

When the two TCPs are **within sight of each other**:

- They should use pre-arranged visual signals to communicate.
- One TCP should wait until signals are acknowledged by the other TCP before changing traffic flow.

When the two TCPs are **not inter-visible**, such as on curves or hills, they should either use two-way radios or take the following steps:

1. Station a third TCP between them so that signals can be relayed visually. This third person should stand outside the travel lanes at a location visible to the two other TCPs. This will be practicable only within short work zones.
For illustrations of these positioning requirements, see [Figure 5.7: Positioning Requirements When Two TCPs Are Not Inter-Visible](#).
2. Equip the intermediate TCP with a Stop/Slow paddle for relaying signals from the TCP at one end to the TCP at the other end.
3. Ensure that all three TCPs understand and acknowledge the pre-arranged signals.

Section 5: Traffic Control Persons (TCPs)

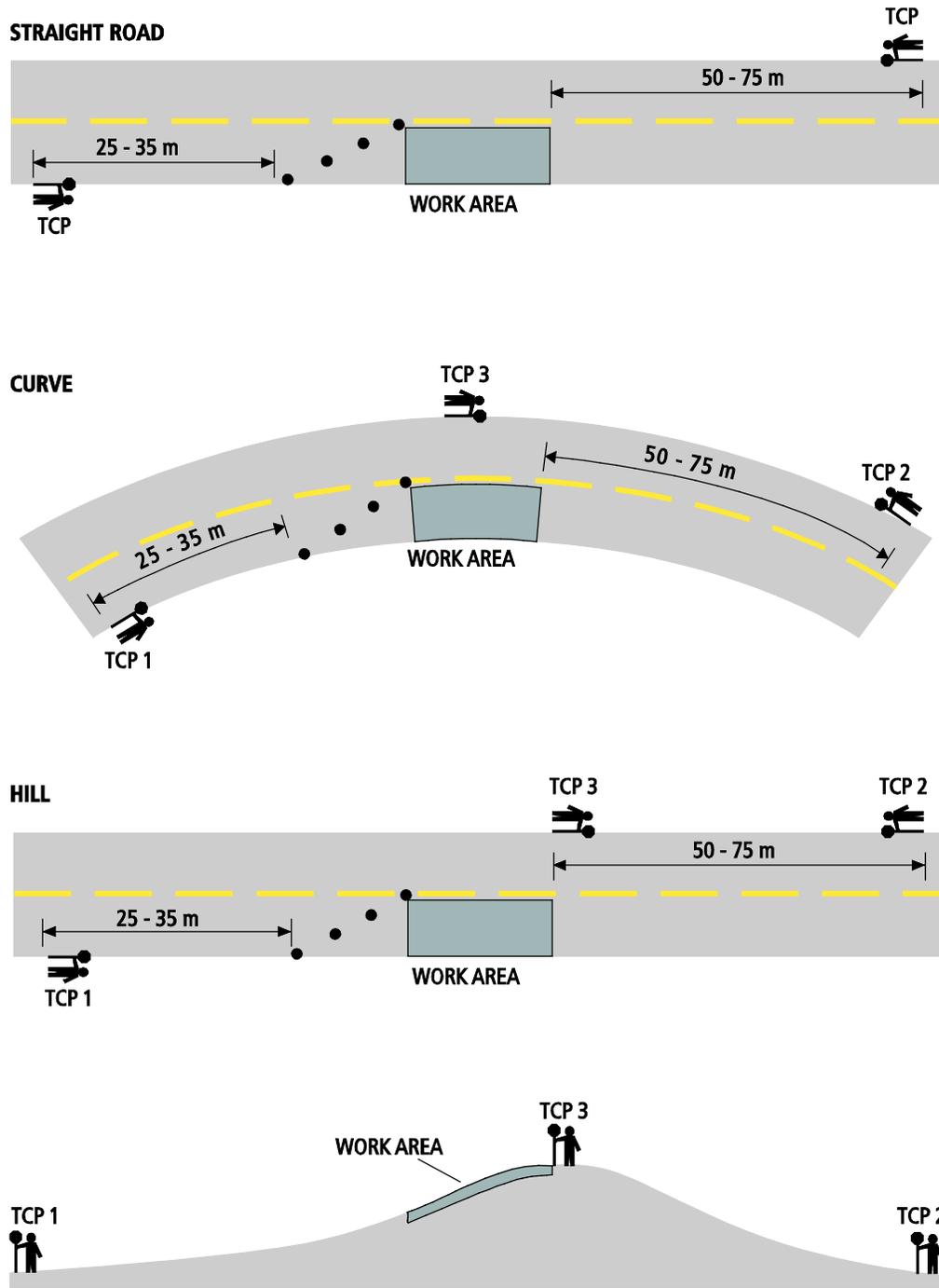


Figure 5.7: Positioning Requirements When Two TCPs Are Not Inter-Visible

5.5.2 TCP Radios

1. Radio-Based Tasks

Using radios allows TCPs to carry out several important tasks:

- communicate with others in areas where they cannot be seen
- pass along information about traffic in the queue or passing through the site
- advise of movements or encroachment of construction traffic on travelling lanes
- smoothly coordinate the movement of public and construction traffic
- advise of incidents or issues that may occur on the site
- warn of approaching emergency vehicles
- coordinate safe passage of construction traffic past the vehicle queue

2. Rules for Radio Use

When using radios, TCPs should follow these rules:

- use as specified in the manufacturer's instructions and conditions of use
- ensure that radios work properly across the work zone or work activity area before beginning to use them for traffic control
- carry spare batteries and have chargers readily available
- use only one ear for a headset or receiver, keeping the other free for hearing other noises in the area
- ensure that both hands are free for use
- pre-arrange voice signals for every situation, and do not change them
- speak clearly
- ask for unclear messages to be repeated
- avoid unnecessary talk
- avoid inappropriate comments
- be aware of signal delay and allow time for the transmission to get through

3. Radio Frequencies

It is important to use radio frequencies that allow for communication not only between TCPs but also with the Site Foreman, First Aid Attendant, and equipment operators who may be encroaching on or entering into the travel lanes.

It is best to use one common frequency for all onsite personnel. If this is not possible, the Traffic Control Supervisor should carry an additional radio that uses the work site frequency in order to communicate with the work site and help to coordinate movements and pass information to TCPs on their radio frequency.

5.6 TCP Positioning and Signals

5.6.1 Hazard and Risk Assessment

When deciding on a position for the TCP and the traffic queue, it is important to identify and assess the potential risks associated with all site hazards.

If TCPs and traffic queues will be positioned such that the TCPs are at high risk from a hazard, appropriate steps should be taken to eliminate or minimize the risk. It may be necessary to remove the hazard or reposition the TCP.

Hazards that create risk for TCPs include, but are not limited to:

- rock fall areas or avalanche zones (seasonal)
- blind corners and hill crests
- tunnel entrances and exits
- lengthy or steep grades
- danger trees
- wildlife
- dark or remote areas
- heavy traffic congestion
- large commercial or business accesses

Note: TCPs should be able to focus their attention on traffic and not be distracted by having to watch out for other hazards.

The distance between the Traffic Control Person Ahead C-001-1 sign and the TCP should not exceed 150 metres unless local site conditions (curves, hills, etc.) govern. If there is not an ideal location within this distance because of road features or conditions, an additional sign should be used in advance of the C-001-1, such as a Flagger Ahead C-001-2 sign or a Prepare to Stop C-029 sign.

5.6.2 Positioning Rules for TCPs

1. Stand either on the shoulder adjacent to the traffic being controlled or in a lane that has been closed to traffic, on the same side of the roadway where you are controlling traffic. Be aware that the closed lane is not the opposing lane, even when controlled by another TCP or device.
 - Always plan an escape route from every position you assume—i.e., an uninhibited path for avoiding errant vehicles (see also [Section 5.7.1: Ability to Make Evasive Manoeuvres](#)).
 - After more than one vehicle has been stopped—and only if necessary—you may move into the lane under your control to assess queue length or to achieve a better view of approaching vehicles.
 - Avoid entering a lane being used by opposing traffic.
 - Return to your starting position before you release the stopped traffic queue.

Section 5: Traffic Control Persons (TCPs)

2. Unless otherwise specified, stand 25 to 35 metres from the TCP taper and 50 to 75 metres from the downstream taper to avoid out-of-control vehicles and to provide manoeuvring room for responding to vehicles that make unanticipated lane changes.
3. Face the centre of the road, with your back to the road shoulder, scanning traffic approaching from both directions. Remain aware of what is happening in the stopped lane.
4. For intersection traffic control, it may be necessary to stand in the middle of the intersection, in which case it may not be possible to comply with the three rules above.
5. Stand where you can see equipment on the site and where you can see—and be seen by—approaching drivers. To the extent practicable, stand where the background will make you as conspicuous as possible.
6. To be visible to drivers, stand away from the other workers, and never stand in a group of people while stopping traffic.
7. Never use your body as a barrier for blocking errant vehicles.

Regardless of the rules listed above, TCP safety is paramount. Therefore, always stand where you can see and be seen by approaching drivers, in a position that is suitable for safely stopping traffic and/or directing traffic through the work activity area, and where there is an escape route.

5.6.3 Positioning Rules for TCPs in Intersections

1. TCP direction in intersections cannot conflict with the direction provided by any existing intersection control. Traffic signals shall be shut off or changed to flash mode. Stop signs shall be covered.
2. Traffic Control Persons must be visible to approaching traffic and not obscured by advance warning or other signage.

5.6.4 Temporary Stop Bars

Temporary stop bars (stop lines) may be used by TCPs to help define a specific stopping location in advance of the TCP position.

Temporary stop bars not only provide road users with defined stopping locations but also help TCPs to maintain a safe separation from stopped vehicles.

A temporary stop bar must be white, and at least 25 cm (10") wide. It should extend across the full width of the lane for which it is intended, perpendicular to the direction of vehicular travel. It is made of low-profile plastic or another temporary material that is heavy enough not to be displaced when vehicles stop on it or are driven over it at anticipated speeds. The profile must be low enough that it does not impede traffic flow when being crossed by traffic.

One tubular marker should be used on the shoulder side and one on the median side of a temporary stop bar, with each tubular marker displaying the appropriate Stop Line R-025-R or R-025-L sign.



Figure 5.8: Temporary Stop Bar

A temporary stop bar should be placed at least one-half of Distance A from the TCP (Distance A values are those shown for Construction Sign Spacing in [Table B – Device Spacing Lengths](#), see [Section 6.6 or Appendix F](#)), with sufficient sight distance provided for approaching drivers.

A temporary stop bar should not be placed:

- on sharp horizontal or vertical curves
- across bicycle lanes
- through pedestrian crossings
- within intersections that have permanent stop bars

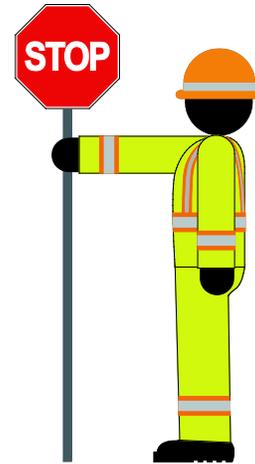
5.6.5 TCP Signals

TCP signals shall comply with the specifications described and illustrated in Part 18 of WorkSafeBC's Occupational Health and Safety Regulation:

<http://www2.worksafebc.com/publications/ohsregulation/part18.asp>

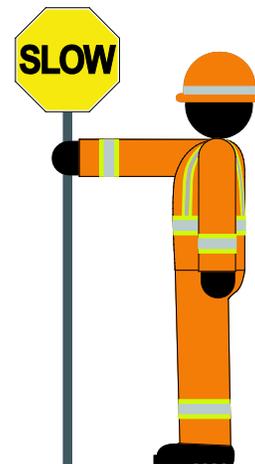
1. Signal for Stopping Traffic

1. Position yourself in a safe position. See [5.6.2 Positioning Rules for TCPs](#).
2. Stand on the roadway shoulder, where you can see, and be seen, with toes pointing towards the centre of the road, and hold the paddle out to stop the first vehicle. Always display the paddle in a static manner, and hold the paddle so that it is visible to traffic.
3. Once you have stopped the first vehicle, adjust your position so that you are standing in a position where you can see, and be seen by, approaching drivers from a sufficient distance to stop safely (at least 150 metres).



2. Signal for Slowing Traffic

1. Extend the traffic control paddle towards the lane of oncoming traffic.
2. Wave the traffic forward with your other hand to avoid bringing traffic to a full stop.



3. Stopping Sight Distances

When slowing and stopping traffic, it is critical to remember the required stopping distances for vehicles travelling at various speeds. The faster a vehicle is moving, the more distance it requires to stop. The size and weight of a vehicle also affect its stopping distance.

Table 5.1: Stopping Sight Distances

Vehicle Speed (km/h)	Stopping Sight Distance (m)	Notes
50	60	<ul style="list-style-type: none"> • These are stopping sight distances (SSD) for passenger vehicles in wet conditions on a level roadway. • More stopping distance is required for larger, heavier vehicles. • More stopping distance is required on a downgrade. • The table values are from the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (2017), rounded to the nearest 10.
60	80	
70	110	

5.7 TCP Safety

5.7.1 Ability to Make Evasive Manoeuvres

1. TCPs should be positioned so that they can make evasive manoeuvres to avoid being struck by a vehicle.
2. If an errant vehicle enters the work site, TCPs are responsible for using their escape routes.
3. If it appears that the vehicle is not stopping, the TCP should notify personnel working on the site (via radio or audible device), and observe and document as many details as possible for subsequent follow-up.
4. Although many TCPs use their vehicles as refuge, they should not position themselves in such a way that the presence of the vehicle or other equipment reduces their options for making evasive manoeuvres.

The same precautionary principle applies to working near equipment, barriers, or opposing traffic.

5.7.2 Management of Approaching Vehicle Speeds

1. Speed Management Delineation

Centreline or edge line delineation can be used to reduce vehicle speed in advance of the TCP position.

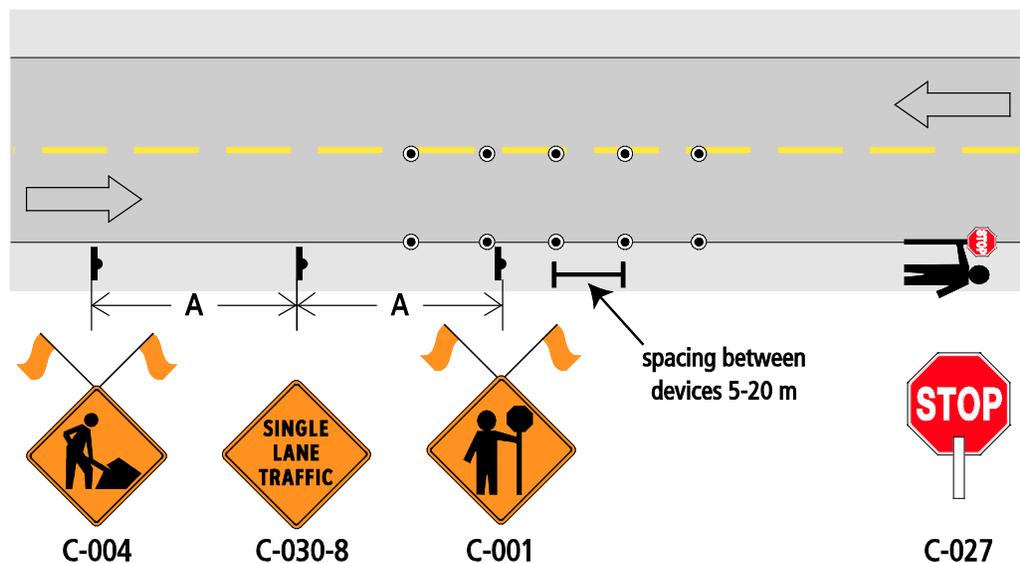


Figure 5.9: Centreline and Edge Line Delineation

2. Speed Management at Night

When TCPs are working during hours of darkness and are having difficulty getting traffic to stop, various traffic control options may assist with slowing and stopping traffic.

Examples include, but are not limited to:

- increasing number of advance warning signs and devices
- increasing sign sizes
- using dynamic messaging signs (DMS)
- using speed reader boards
- using an oversized STOP R-001 sign (75 cm x 75 cm) on a barricade across the closed lane where the TCP is positioned

5.7.3 Prohibitions for TCPs While Actively Controlling Traffic

1. Never stand near a vehicle or sit in a vehicle when actively controlling traffic.
2. Never argue with a driver.
3. Never stand in an open travelled portion of the roadway while traffic is moving.
4. Never accept an assignment to carry out other onsite work, and never attempt to carry out any other onsite work.
5. Never allow the TCP sign to be displayed when a TCP is not directing traffic.
6. Never give direction that contradicts a traffic signal.
7. Never converse with any person about anything that is not work-related, and ensure that all work-related conversation is both necessary and brief.
8. Never sit when actively controlling traffic.
9. Never lean on a post or other object.
10. Never use a mobile device, tape, disk, MP3 player, TV, non-work radio, or any other device that impairs sight, hearing, or attention. Use cell phones only to communicate about onsite emergencies.
11. Never stand near equipment.
12. Never turn your back on approaching traffic.
13. Never wear clothing or items that can obscure or reduce peripheral vision, such as hoodies, certain kinds of sunglasses, etc.
14. Never become impatient or enraged.
15. Never attempt to slow traffic by displaying the STOP sign rather than the SLOW sign.
16. Never leave the control position without being replaced. Meal, coffee, toilet, and rest breaks should be pre-arranged before work starts.
17. Never regulate traffic if your judgment is impaired in any way.
18. Never regulate traffic if you have suffered a reduction in performance that could increase anyone's exposure to risk.

5.8 Emergency Procedures

5.8.1 Passage of Emergency Vehicles and Personnel

TCPs should review the Traffic Management Plan, which may specify how emergency vehicles and personnel are to be accommodated or taken through the work zone, and should discuss the process to be used in these situations with the Traffic Control Supervisor and Site Supervisor.

TCPs need to be aware of any instructions that should be communicated to the drivers of emergency vehicles, including:

- the path to drive
- where hazards may exist
- any communications required along the way (e.g., the lead vehicle may be given a radio with the site frequency to be returned to the TCP at the other end)
- a site map if the work zone is long, such as a repair work zone established to deal with a significant flood event

In smaller rural communities, many emergency service providers are volunteers, which means that the emergency facility is not staffed on a regular basis. In these situations, volunteers may be driving personal vehicles to their “hall” to pick up emergency vehicles.

There should be a process for allowing these volunteers to get to their hall quickly, keeping in mind that they may be passing through the work zone again shortly thereafter with an emergency response vehicle.

5.8.2 Traffic Control at Emergency Scenes

Members of emergency services and recovery groups that may respond to a motor vehicle incident may include:

- police, fire, and ambulance responders
- highway rescue and search and rescue responders
- towing companies
- Road Authority officials
- maintenance contractors
- other emergency groups

Members of these emergency responder groups often have to control traffic around the site of an emergency or crash. Before implementing traffic control, responders and workers should ensure their own safety and the safety of others.

Having assured the safety of themselves and other onsite personnel, emergency responders are expected to maintain traffic operations through the area impacted by the emergency by employing basic traffic control principles, and to be trained in:

- basic traffic control techniques
- traffic control equipment setup, operation, and take-down
- the traffic management principles outlined in this Manual
- the use of a buffer vehicle to protect the workplace
- the use of appropriate personal protective clothing and safety equipment
- other appropriate safe work procedures

If the traffic control situation will persist for more than two hours, the emergency responders directing traffic are expected to be trained in a manner acceptable to WorkSafeBC for high-risk traffic control or to be replaced by personnel who have this training.

PART B – TRAFFIC CONTROL

Section 6: Traffic Control Layouts – General Instructions

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PART B – TRAFFIC CONTROL

Section 6: Traffic Control Layouts – General Instructions

This section outlines the appropriate development and use of the traffic control layouts described in Sections 7 to 19. The user of this manual should have a thorough understanding of the information in this section before applying the layouts.

Important Notes for Layouts in Sections 7 to 19

1. The traffic control layouts are considered the minimum standard. The associated text description highlights the key standards as well as guidance and options that can be considered by the user.
2. Although this Manual often identifies traffic control requirements by using the word “shall,” there may be circumstances where strict compliance with the requirements is not reasonable and it will be necessary to deviate from the requirements. In these cases, written justification for the modification must be recorded and depending on the complexity of the modification, written permission may need to be granted by the Road Authority.
3. A variety of conditions may be encountered, and no single standard sequences of signs or other traffic control devices can be set up as an inflexible arrangement for all conditions and locations. Furthermore, it may be impossible to comply with the minimum standards in emergency situations.
4. If the layouts in the Manual are not working in a particular situation, alternatives should be considered and implemented.
5. If it is necessary to deviate from the requirements in the Manual, the Prime Contractor should contact the Road Authority.

TCP Acronym

TCP is generally used for Traffic Control Persons throughout Sections 6 to 19.

Side-by-Side Formatting

The layouts in Sections 7 to 19 are shown with the **description on the left** and the corresponding **diagram on the right** so that readers can see them side-by-side

6.1 Introduction to Work Zone Components

Temporary traffic control measures are required within work zones to safely guide and protect road users and workers.

For the purposes of this Manual, a **work zone** is:

A roadway area in which road user conditions have been temporarily changed for the purpose of construction, maintenance, utility work, or for emergency incident management.

A work zone is typically marked by temporary traffic control devices such as signs, channelizing devices, barriers, pavement markings, and/or work vehicles. It usually extends from the first to the last of the traffic control devices, and is generally the area between the first advance warning sign and a point beyond the work operations where traffic is no longer affected by temporary controls.

As shown in [Figure 6.1: Overview of the Six Work Zone Components](#), work zones can be divided into six components:

1. Advance Information Zone (optional)
2. Advance Warning Area
3. Transition Area (if a lane or shoulder is closed)
4. Buffer Space
5. Work Activity Area
6. Termination Area

[Figure 6.1: Overview of the Six Work Zone Components](#) shows a general concept of the work zone components and how they relate to where devices may be located. For traffic control device selection, refer to the appropriate reference layout found in Sections 7 to 19.

Each component is discussed individually in [Section 6.2: Work Zone Components](#) for one direction of travel. If the work activity affects both directions of travel, the same principles apply.

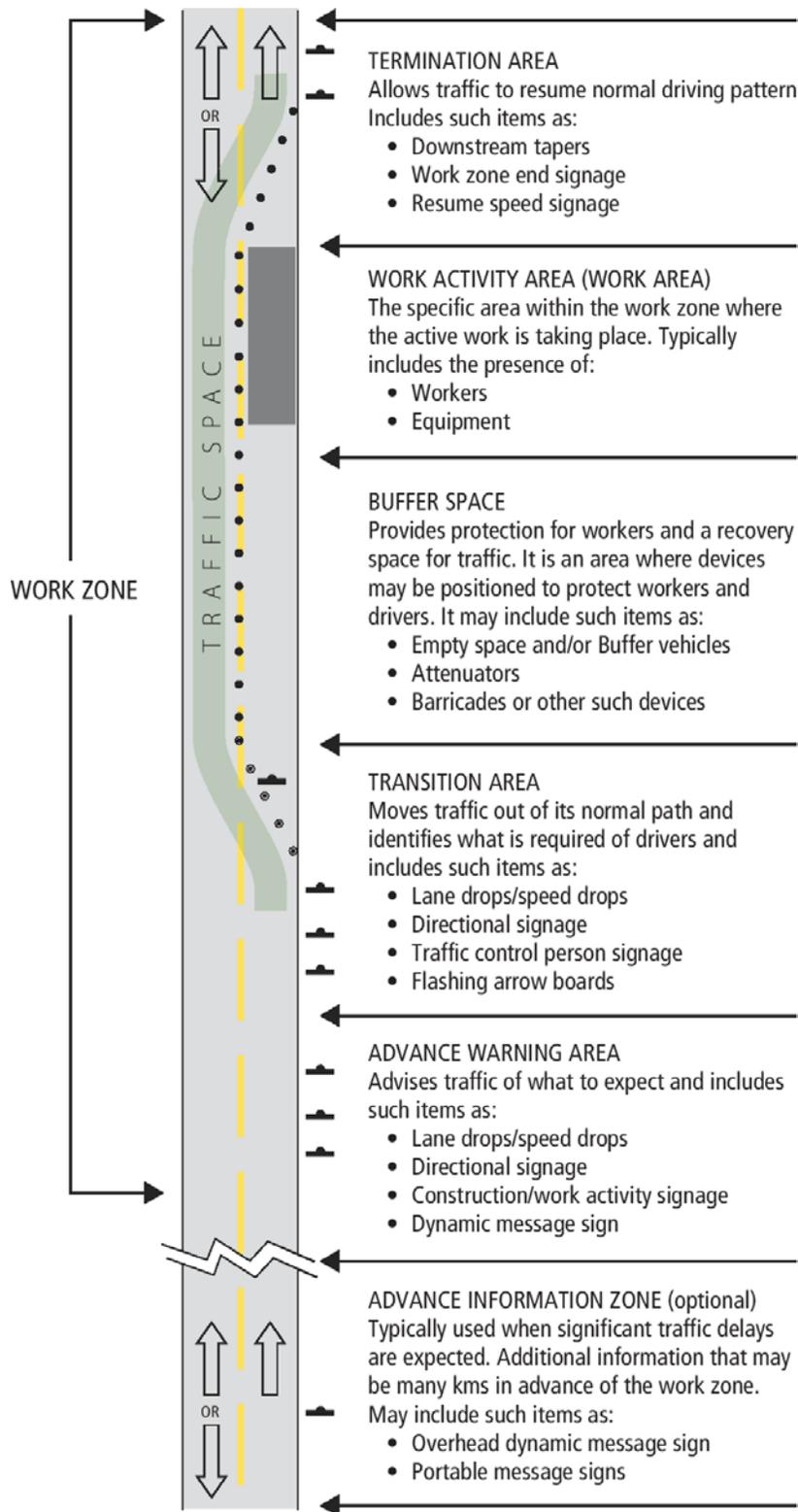


Figure 6.1: Overview of the Six Work Zone Components

6.2 Work Zone Components

6.2.1 Advance Information Zone (optional)

The Ministry has strategically placed overhead Dynamic Messaging Signs (DMS) throughout the province. These can be utilized to provide greater information to travellers, particularly when there are significant impacts or delays. Portable message signs may also be used to provide this advanced information.

The Project Manager would work with the Transportation Management Centre of British Columbia (TMCBC) to post messages on the overhead DMS.

6.2.2 Advance Warning Area

The advance warning area is the area where road users are informed of what to expect ahead. The length of the advance warning area from the first sign to the beginning of the transition area should provide drivers with enough time to adjust their driving patterns safely and appropriately.

The number of traffic control devices in an advance warning area may vary from a single sign or a rotating/flashing light on a vehicle to a series of signs and the use of a portable dynamic message sign (DMS).

The required length of the advance warning area increases with the roadway speed so that road users may more readily perceive and respond to the work condition ahead. Sight distances should be sufficient for drivers to see the situation, interpret what they are seeing, decide what to do, and do what needs to be done (see [Section 2.3.3: Manage Driver Sight Distances](#)).

Advance warning signs are generally not required when the work activity area and access to it are entirely off the roadway and shoulder, and the work does not interfere with traffic, but they should be used when any traffic flow problems or conflicts could possibly occur.

6.2.3 Transition Area and Tapers

Transition Area: The transition area is the area in which vehicles are channelized/redirected from their normal path of travel into a new path in order to move around the work activity area. This movement of traffic is achieved by using channelizing devices and directional signs in the tapers that are used to close lanes.

The transition area should be obvious to road users, with the correct path clearly identified with pavement markings and/or channelizing devices so that drivers will not attempt to follow the normally travelled path.

For moving work operations, the transition area moves with the work activity area. A shadow vehicle may be used to warn traffic and/or guide traffic into the proper lane (see [Section 4.11.5: Shadow Vehicles](#)).

Tapers: Tapers are used in both the transition and termination areas, and are created with a series of channelizing devices or pavement markings placed to move traffic out of—or back into—its normal path. Adjustments to standard taper lengths may be necessitated by the presence of access/egress points and other site constraints. Five different tapers are used within work zones.

1. Merging Taper

A merging taper (lane closure taper or channelizing taper) is most commonly used on a multilane roadway to close a lane and combine its traffic with that of the adjacent lane.

The length of the taper should be appropriate for the speed of traffic and the complexity of actions that drivers will be undertaking—for example, merging versus making a lane shift (see [Table A – Taper Lengths](#) in [Appendix F](#)).

After a merging taper is installed, traffic should be observed to determine whether or not the taper is working well. The frequent use of brakes and evidence of skid marks indicate that the taper is too short or the advance warning is inadequate.

If restricted sight distance is a problem, the taper should begin well in advance of the sight restriction—for example, a sharp curve. The beginning of a taper should not be hidden downstream of curves.

2. Lane Shift Taper

A lane shift taper is used when there is a change in alignment of the travelled lane that does not necessitate a merge. A lane shift taper generally requires half the length of a merging taper.

3. Shoulder Taper

A shoulder taper closes a shoulder to traffic so that shoulder work can be undertaken or equipment can be placed on the shoulder.

When a wide, paved shoulder is closed adjacent to a high-speed roadway, it should be treated as a closed portion of the travelled roadway so that drivers do not pull off onto the shoulder or stop in the work zone.

Shoulder tapers are often used in combination with merging tapers. A shoulder taper used to close a non-travel lane does not require the length of a full merging taper, but if the shoulder is used as a travel lane, a normal merging taper length should be used so that drivers do not mistake the closed shoulder for a lane.

4. TCP, AFAD, or Signal Taper

A Traffic Control Person (TCP), Automated Flagger Assistance Device (AFAD), or signal taper is placed in advance of a work activity area to implement a single lane alternating traffic (SLAT) pattern.

This taper is not used to merge traffic but rather to close a work area to traffic and indicate that a speed and path adjustment will be required. It is typically 15 metres long and contains five equally-spaced channelizing devices in the closed lane, with the right-of-way usually assigned by one or more TCPs or AFADs, a temporary traffic signal, or temporary self-regulating lane control.

5. Downstream Taper

A downstream taper is installed in the termination area at the far end of the work activity area to direct traffic back into its normal path. A downstream taper is not advisable when work vehicles are moving into or leaving the work activity area from the downstream end.

6.2.4 Buffer Space

The buffer space is the unoccupied space between the transition area and the work activity area. It improves safety for drivers and workers by providing recovery space for errant vehicles. They should be included wherever possible.

Circumstances that may necessitate the implementation of a buffer space include:

- poor sight distance in advance of the work activity area
- high speeds and/or high traffic volumes on the roadway

The buffer space should be kept free of equipment, workers, and materials, and should be free of vehicles except when a buffer vehicle is used.

For moving operations in which a shadow vehicle is used, the buffer space is the space between the shadow vehicle and the work vehicle.

6.2.5 Work Activity Area

The work activity area is the area where the work is taking place.

It may be a fixed location or multiple locations as moving work progresses down the roadway. The work activity area is closed to traffic, set aside for exclusive occupation by workers, equipment, and construction activities, and is delineated by channelizing devices.

Potential **hazards increase** in and around a work activity area when:

- the work activity area is close to the travel lanes
- traffic speeds and volumes increase
- work activities affect normal traffic operations (e.g., uneven pavements, vehicles loading or unloading)
- the change in travel path becomes more complex (e.g., traffic is shifted across the median and into lanes normally used by opposing traffic)

Minimize hazards between traffic and the work activity area by considering the following:

1. Use traffic control devices to make the travel path clearly visible to traffic. Avoid gaps that may falsely suggest to drivers that they have passed through the work zone.
2. Place channelizing devices between the work activity area and the travel path. Devices placed on a tangent along the work activity area to keep traffic out of a closed lane should be spaced appropriately—for the extent and type of activity, the speed limit of the roadway, and the vertical and horizontal alignment—so that it is obvious that the lane is closed. For urban streets and low-speed roadways, closer spacing may be required.
3. Provide an unobstructed entrance and exit for work vehicles.
4. Protect moving operations with adequate advance warning of the work and/or shadow vehicles.

6.2.6 Termination Area

The termination area is a short distance through which traffic clears the work activity area and returns to the normal traffic path. It extends from the downstream end of the work activity area to the last temporary traffic control device and may include a downstream taper.

There are occasions where the termination area may include a transition area. For example, if a taper is used to shift traffic into an opposing lane of a multilane roadway, the termination area needs a taper to shift traffic back to its normal path.

A buffer space may be used between the end of the work activity area and the beginning of the downstream taper.

6.3 Overlapping Work Zones

Overlapping work zones occur when signs and devices overlap from two separate work zones.

Work zones that are in close proximity to one another, but signed independently, may create driver confusion and lead to undesirable driver behaviour. When traffic control layouts have the potential to overlap, contractors and Traffic Control Supervisors should work cooperatively to develop a joint Traffic Control Plan to ensure that the traffic control setups do not conflict.

Coordinate overlapping work zones to:

- reduce message conflicts.
- prevent driver confusion and frustration.
- increase maintenance efficiencies for signs and devices.
- contribute to safer traffic control and better overall driver compliance.

Rural areas, where work is one kilometre apart or less, should be managed as one continuous work zone. This prevents driver confusion and frustration, and makes it easier for Traffic Control Persons to maintain appropriate signage.

See [Figure 6.2: Overlapping Work Zones – Uncoordinated and Coordinated Setups](#) for examples of improper and proper traffic control setups for two work zones in close proximity.

Even when the sign layouts do not overlap, it may be beneficial to develop a cooperative Traffic Control Plan when the work areas are within one kilometre of each other.

[Figure 6.2: Overlapping Work Zones – Uncoordinated and Coordinated Setups](#) shows a general concept of overlapping work zones and how they relate to where devices may be located. For traffic control device selection, refer to the appropriate reference layout found in Sections 7 to 19.

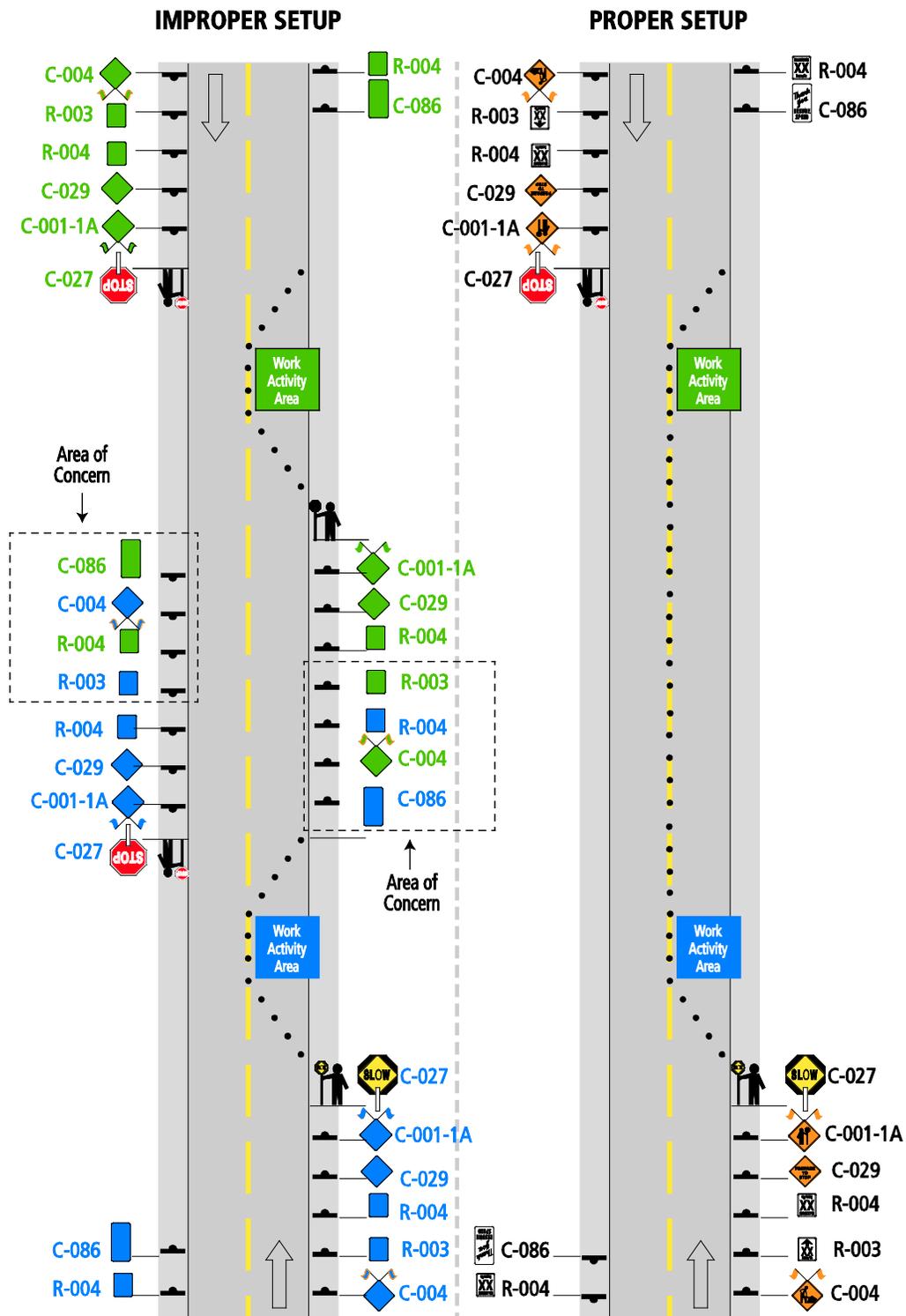


Figure 6.2: Overlapping Work Zones – Uncoordinated and Coordinated Setups

6.4 Queue Management

6.4.1 Advance Warning and Queue Length

The typical traffic control layouts and associated spacing may not be sufficient for queue management when:

- Traffic is stopped for too long, and the queue extends back past the advance warning signage.
- Hills and/or curves prevent drivers from seeing the back of the queue.

These conditions make it difficult for drivers to see that they are approaching a work zone or the end of a traffic queue. The techniques and options for improving overall queue management may include:

- reducing queue length by reducing stoppage times within work zones or where Traffic Control Persons are positioned
- reducing the length of a single lane alternating traffic section—the distance between stop bars or TCPs
- scheduling the work activity at a time when traffic volumes are lower
- using additional signage in advance of the main construction zone signage¹ (see [Figure 6.3: Managing Queue Length and Additional Advance Warning](#))
- undertaking frequent sign checks to ensure that all signs are erect and visible to approaching drivers
- adjusting the placement of signage so that it is in the most visible location, and repeating the signage at the approach to the work zone

Also consider any other conditions that may make a standard advance warning setup insufficient for the situation, including:

- weather conditions, such as fog, that make it difficult to see signs in the approach to a work area
- high winds or routes with limited or no shoulder space, making it difficult to erect signs with appropriate spacing and ensure that they stay erect

When such conditions exist, additional advance warning signage and sign checks may be required.

¹ Use the Traffic Control Person Ahead C-001-1 sign only in the vicinity of a TCP, not in any other advance warning series.

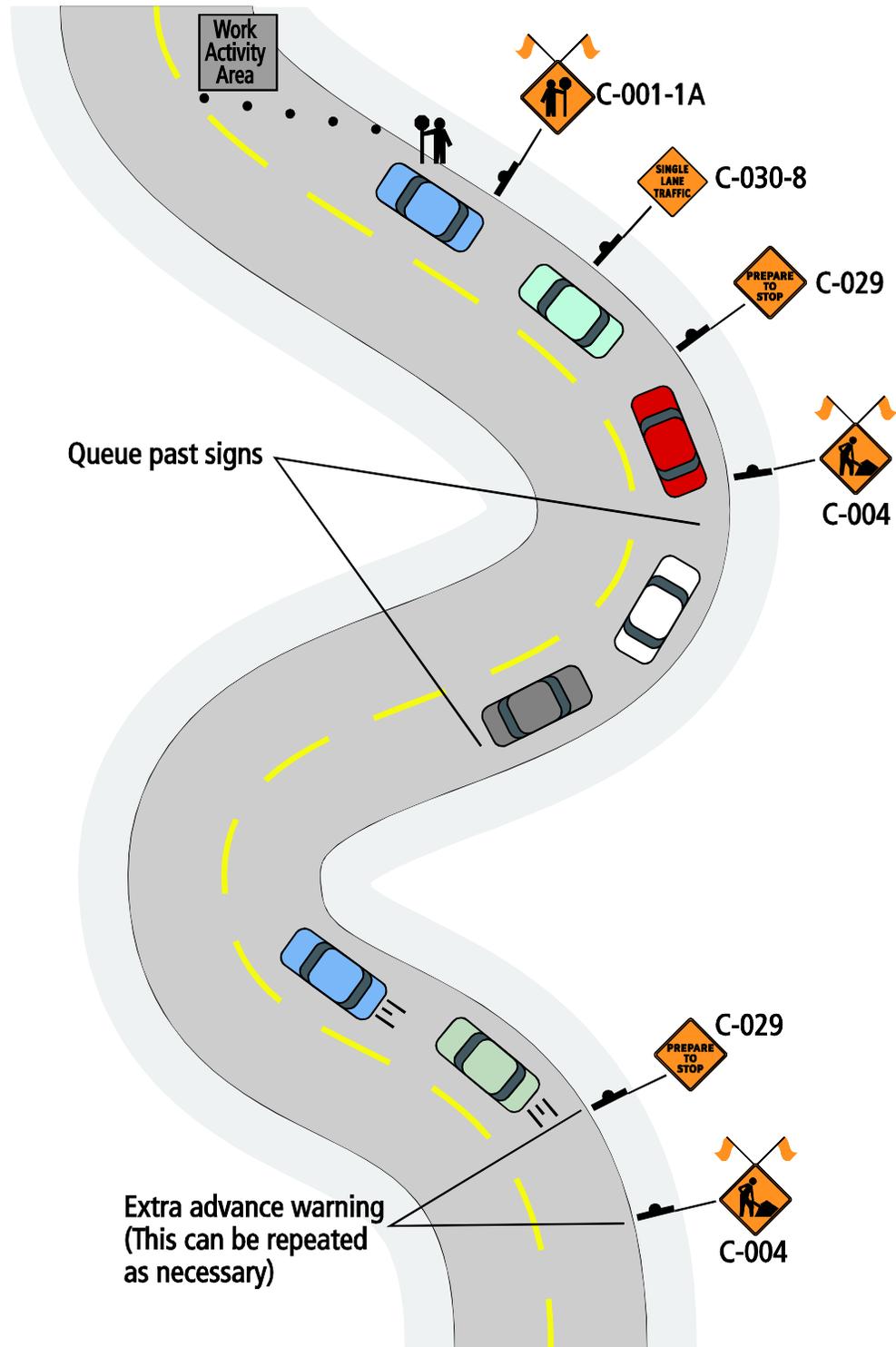


Figure 6.3: Managing Queue Length and Additional Advance Warning

6.4.2 Preventing Premature Queue Shifting

Premature queue shifting occurs when drivers move into the directed lane well upstream of the traffic control person. This creates problems for the following reasons:

- All vehicles in the queue must be released in order to clear the lane for opposing or work traffic.
- It is difficult to stop the queue for emergency or work functions.
- It is difficult to accommodate the passage of emergency vehicles.
- If the traffic is being controlled by traffic signals, the vehicles may no longer be passing over the detectors.

Using centreline delineation on the approach to a stop condition defines the path for traffic to follow and keeps vehicles in the appropriate lane until drivers are directed to shift. This delineation method is useful because:

- It keeps drivers in the required travel lane as they approach and depart from the Traffic Control Person.
- It provides visual cues to drivers that may assist in slowing the speed at which they join the queue.

See also [*Figure 6.4: Premature Queue Shifting and Prevention of Premature Shifting.*](#)

PREMATURE SHIFTING

PREVENTING PREMATURE SHIFTING

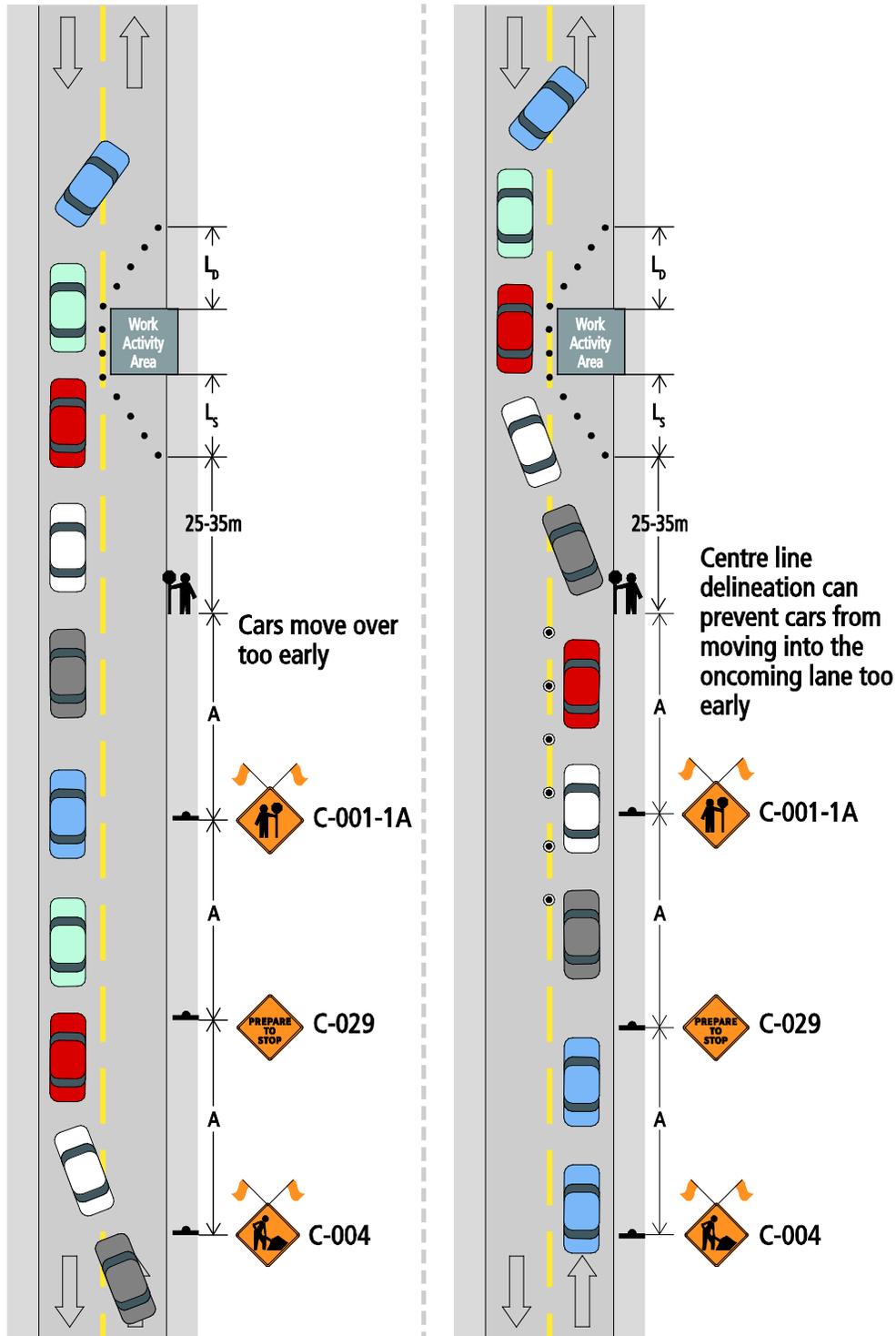


Figure 6.4: Premature Queue Shifting and Prevention of Premature Shifting

6.5 Treatment of Drop-Offs and Travel Lane Excavations

6.5.1 Drop-Offs

Drop-Off An abrupt change in elevation created by construction activity (such as milling, paving, or excavation) that is steeper than 3:1 (non-traversable slope). It is typically adjacent to a travel lane, and runs parallel to the direction of travel.

Drop-offs in work zones should be marked with appropriate signing and devices.

Roadways with drop-offs should have regular, scheduled inspections—including over weekends and holidays—to ensure that the appropriate devices are in place.

Drop-offs that are left exposed to traffic shall be treated as follows:

1. If the drop-off is caused by the removal of barrier, Barrier Removed C-069 signs shall be installed in advance of the drop-off and every 500 metres as long as the condition persists.
2. Drop-offs ≤ 60 mm (2.5") should be signed with a Low Shoulder C-013 sign to alert motorists to the condition. The sign should be repeated at least every 500 metres as long as the condition persists.

On two-lane, two-way roadways, the sign may have to be applied for both directions of travel, and "no passing" restrictions may have to be considered. This type of drop-off is common in shoulder rehabilitation and gravel shoulder maintenance projects.

3. Drop-offs > 60 mm (2.5") but ≤ 130 mm (5") should be delineated with tubular markers or drums, and signed with Low Shoulder C-013 signage. The tubes or drums should be spaced according to [Table B – Device Spacing Lengths](#) (see [Appendix F](#)).
4. For drop-offs > 130 mm (5") but < 300 mm (12"), a speed reduction to 80 km/h or less is required, as well as appropriate signage and delineation using tubes or drums.
5. The following treatment options exist for drop-offs ≥ 300 mm (12"):
 - Where the drop-off will be present for 48 hours or less, the drop-off treatment may be as indicated in #3 above; or
 - Closure of an adjacent travel lane in the same direction (for multi-lane highways); or
 - Creation of a lane shift to move traffic away from the drop-off by at least the distance shown in [Table 6.1: Minimum Distance from Edge of Travel Lane to Drop-Off](#), in addition to the treatment indicated in #3 above; or
 - Installation of a temporary barrier with at least 300 mm (12") between the back of the barrier and the drop-off, and at least 600 mm (24") between the front of the barrier and the edge of the travel lane. An approved barrier terminal, flare, or crash attenuator is required at the beginning of the barrier section, and the barrier should have retroreflective markers and/or warning lights for night-time use.

When considering the options above, reducing the lane width to 3.2 metres is generally acceptable.

For situations in which no temporary barrier is installed, [Table 6.1: Minimum Distance from Edge of Travel Lane to Drop-Off](#) shows the minimum distance required between the edge of a travel lane (as marked by a fog/edge line or a line of channelizing devices) and a drop-off ≥ 300 mm (12").

Table 6.1: Minimum Distance from Edge of Travel Lane to Drop-Off

Regular (Non-Construction) Speed Limit (km/h)	Distance from Edge of Travel Lane to Drop-Off (m)
≤ 60	0.5
70 - 100	1.5
≥ 110	3.0

Example:

On a 110 km/h highway, a 60 cm (24") deep excavation is required alongside the travel lane. The project team determines that if they apply a lane shift to move traffic away, traffic will be shifted by only 1.8 metres.

Since a 3-metre offset is the minimum required for a 110 km/h highway, the lane shift is not an acceptable option. Instead, the project team should consider closing a lane or installing a temporary barrier.

If a highway design Engineer prepares a design that deviates from the above guidelines, the design shall include a written, stamped, and documented decision that provides the rationale for the alternative strategy.

Possible reasons for using an alternative strategy may include very low traffic volumes, very short work duration, or mitigation of risk through the use of enhanced signing or enhanced enforcement.

6.5.2 Travel Lane Excavations

Excavation An abrupt change in elevation created by construction activity within the travelled portion of the roadway.

Excavations ≥ 60 mm (3") that are left unattended and exposed to traffic shall be treated as follows:

1. If the regular (non-construction) speed limit is ≥ 70 km/h, excavations may be treated by:
 - Backfilling the excavation, paving to match the existing grade, and installing a Bump or Rough Roadway Ahead C-017 sign ahead of the filled excavation if there is any noticeable difference in elevation; or
 - For situations that are present for no more than 72 hours, backfilling the excavation with gravel and compacting it to match the existing road grade, without paving. A Motorcycle Rough Surface C-019 sign with a Gravel Surface C-019-T tab shall be installed ahead of the filled excavation, and the surface should be monitored and maintained as a smooth surface, free of rutting and wash boarding.
2. If the regular (non-construction) speed limit is ≤ 60 km/h, excavations may be treated by:
 - Installing a steel plate across the excavation and installing a Bump or Rough Roadway Ahead C-017 sign or another appropriate warning sign ahead of the covered excavation; or
 - Backfilling the excavation with gravel and compacting it to match the existing road grade. A Motorcycle Rough Surface C-019 sign with a Gravel Surface C-019-T tab shall be installed ahead of the filled excavation.

If it is not feasible to cover or fill the excavation, the affected area will have to be closed to traffic. This may require a full or partial lane closure, with additional traffic control.

6.6 Positioning of Temporary Traffic Control Devices

Roadway tapers are important components of temporary work zones. They are created by using a series of channelizing devices placed to move traffic out of or into its normal path. Table A shows the taper lengths appropriate for various speed limits.

Device spacing on entry to a work zone should be based on the regular posted speed limit of the highway, regardless if a reduced speed is implemented prior to the work zone. The reasons for this are:

1. The 2015 update to the 1995/1999 Traffic Control Manual for Work on Roadways was in part driven by the need to address the Ministry's increased use of night work and subsequent traffic control for highway maintenance and construction.
2. Nighttime brings a reduction in visibility for drivers, and drivers are often less alert during this time period.
3. To mitigate nighttime driver issues of reduced alertness and slower response times, providing greater distances for warning signs and taper transitions may reduce conflicts at merge and shift points.

Options for lengthy work zones where additional work areas may be utilized, including work zones with multiple construction speed limits:

1. All additional signing, tapers, and device spacing within the work zone may be deployed using the regular posted speed limit of the highway.
Example: Regular posted speed limit of highway = 120 km/h, and construction speed limit reduced to 80 km/h. All signing, tapers and devices deployed continue to use the 120 km/h speed.
2. Additional signing, tapers, and device spacing for additional work areas may be based (if a speed reduction is utilized) on the new reduced construction speed limit if signing, tapers, and devices deployed **on entry** have been spaced to the regular posted speed limit, or
*Example: Regular posted speed limit of highway = 120 km/h, all signing, tapers and devices deployed **on entry** use this 120 km/h speed. Reduced construction speed limit is now 80 km/h where additional signing, tapers, and devices may use the 80 km/h speed for layout.*
3. If another additional reduced speed limit is deployed beyond the first construction speed reduction (if a speed reduction was utilized) the signing, tapers, and device spacing for this new reduced construction speed zone will be based on the speed prior to entry to the new speed reduced zone.
*Example: Regular posted speed limit of highway = 120 km/h, all signing, tapers and devices deployed on entry use this 120 km/h speed. First reduced construction speed limit is to 80 km/h, where additional work areas may utilize options 1 or 2. However, an additional work area now calls for a further reduced construction speed limit from the 80 km/h to 60 km/h. In this case, additional signing, tapers, and devices **on entry** to the 60 km/h speed zone may use either:*
 - a) the regular posted speed limit of 120 km/h, or
 - b) utilize the reduced construction speed limit of 80 km/h for the layout **on entry** to the 60 km/h area.

A minimum of five devices are required for any taper.

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

Table A Notes	
Regular Posted Speed Limit	Device spacing and taper lengths should be to the regular posted speed limit.
L _M = Merge Taper Length	Merge length required to close lane on approach to work area. For speeds ≥ 70 km/h, merge length should be at least = $\frac{(\text{lane width of 3.7 m}) \times (\text{Posted Speed in km/h})}{1.6}$, rounded to nearest 10 m.
L _L = Lane Shift Taper Length	Used when a lateral shift is needed within the work area. Lane Shift Taper = $\frac{1}{2} \times L_M$, rounded up to nearest 10 m.
L _D = Downstream Taper Length	May be used in work zone termination area to provide a visual cue to drivers that they may return to the original lane or path that was closed.
L _S = TCP, Signal, and Shoulder Taper Length	<p><u>Shoulder Taper</u>: Used to close shoulders within activity area, or when shoulders might be mistaken for driving lanes. May be increased to $\frac{1}{3} \times L_M$ on higher-speed highways and freeways where shoulder width is ≥ 2.5 m.</p> <p><u>Signal and TCP Tapers</u>: Used in advance of a work activity area where traffic is controlled so that the road is used alternately by traffic moving in each direction.</p>

<p>L_T = Minimum Tangent Length between Tapers</p>	<p>Used between successive tapers or at other decision or conflict points to provide time for drivers to become accustomed to the first change and observe traffic control devices for the second change.</p> <p>$L_T = L_M$, but for high-speed/high-volume freeways and/or night work, it may be doubled ($2 \times L_T$) to increase time for drivers to become accustomed to the first change.</p>
<p>L_R = Run-In Length on Centreline</p>	<p>May be used on centrelines as minimum tangent length before development of lane departures or lane shifts.</p> <p>Run-in length = $0.8 \times$ speed (in km/h) (US Manual of Uniform Traffic Control Devices).</p>

Figure 6.5: Taper Diagram shows a general concept of the lengths found in Table A. For traffic control device selection, refer to the appropriate reference layout found in Sections 7 to 19.

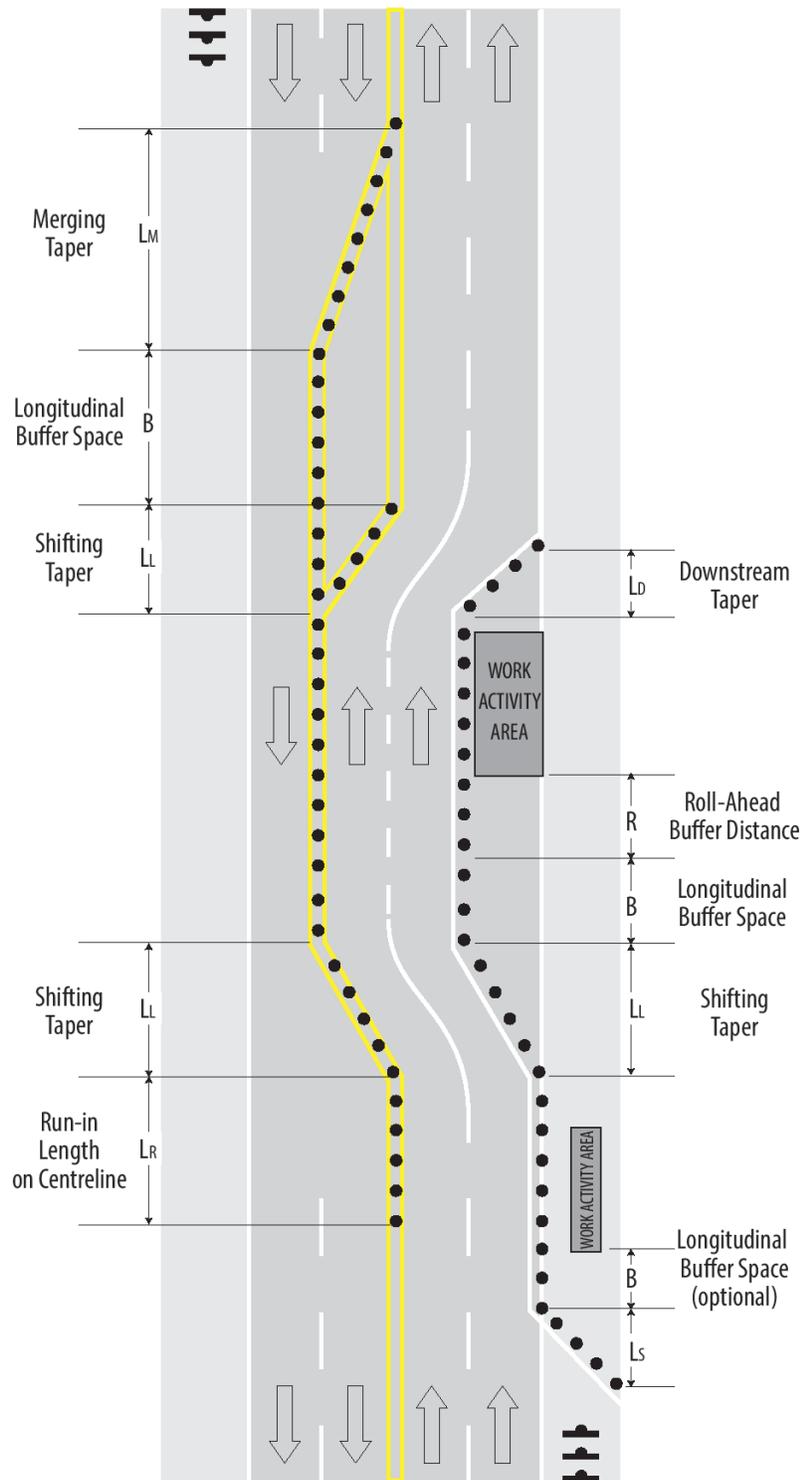


Figure 6.5: Taper Diagram

Tapers require at least five devices—typically drums or tubes.

To set the taper:

1. Place Device 1 as noted in [Figure 6.6: Taper Layout](#).
2. Measure the taper length (parallel to the roadway).
3. Place Device 2 as noted in the figure.
4. Fill in the area between the two devices with devices of the same type, using the spacing shown in [Table B – Device Spacing Lengths](#) as the maximum distance between devices.
5. Adjust the device spacing as necessary.

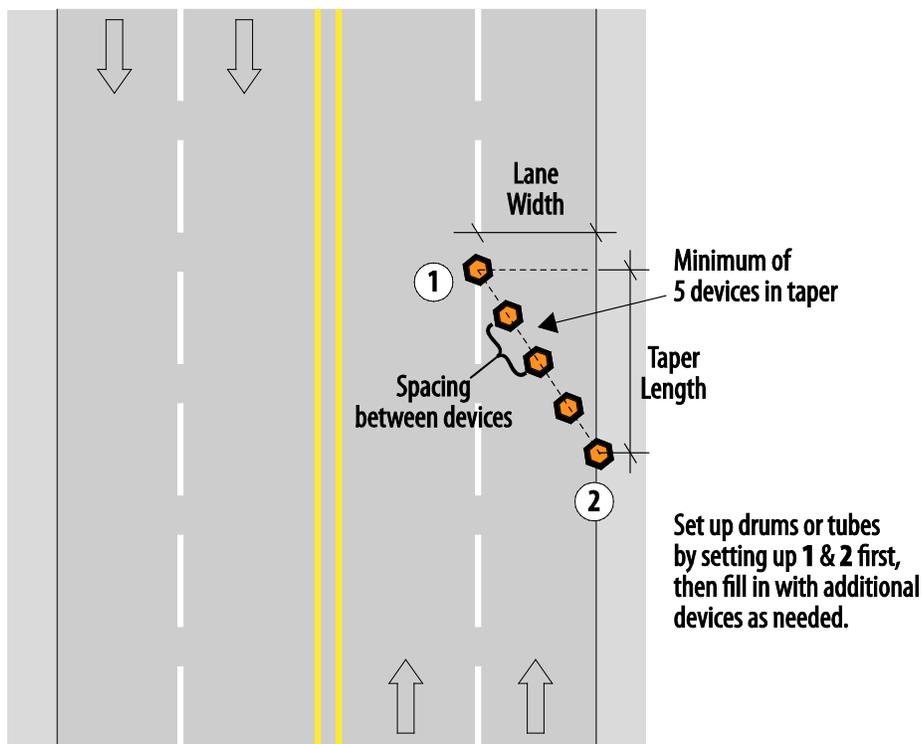


Figure 6.6: Taper Layout

The appropriate positioning of traffic control devices varies with the regulatory speed limit for the roadway and the traffic control devices being used. Some distances shown for 50 km/h and 60 km/h speed limits in Table B are from the BC Traffic Control Manual for Work on Roadways (1999).

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

Table B Notes	
Regular Posted Speed Limit	Device spacing and taper lengths should be to the regular posted speed limit.
A = Construction Sign Spacing	<p>Recommended minimum spacing for signage. Spacing may be adjusted to accommodate site constraints and/or where high numbers of access points exist. Signs within the work zone should be spaced on the basis of the pre-construction, regulatory speed limit.</p> <p><u>Maximum Construction Sign Spacing:</u></p> <ul style="list-style-type: none"> • Spacing for the sign closest to the work activity area should remain as close as possible to Distance A. • For other construction signs in the advance warning area, spacing may be adjusted up to a maximum distance of 2 x Distance A. • Signs that include a distance measurement (e.g., Construction Ahead Next 2 km) should be placed in accordance with the distance cited on the sign or tab.

B = Buffer Space	<p>The longitudinal distance which provides a margin of safety for both the driver and the workers. It is important that the buffer space be free of equipment, workers, material and vehicles.</p> <p>A buffer vehicle with a crash attenuator may be located within the buffer space if there are space constraints.</p> <p>The buffer space is measured is from the end of the taper to the work activity area unless there is a buffer vehicle, in which case it is measured to the back of the buffer vehicle.</p> <p>Typically used on high-speed roadways but should be considered for all works where space allows.</p> <p>Distance is based on the braking distance on level ground for wet pavement as defined in the Transportation Association of Canada's Geometric Design Guide for Canadian Roads (1999).</p>
R = Roll-Ahead Buffer Distance	<p>The longitudinal distance measured from the front of the buffer vehicle to the work activity area. It provides a margin of safety in case of impact.</p> <p>Distance is based on the Minnesota Manual on Uniform Traffic Control Devices (2011).</p>
C = Channelizing Device Spacing for Tapers	<p>Maximum spacing between channelizing devices for tapers.</p>
D = Channelizing Device Spacing on Curves and Tangents	<p>Maximum spacing between channelizing devices on curves and tangents. Tighter spacing is acceptable especially on curves where device loss can impact directional continuity.</p> <p>Maximum device spacing is calculated as $0.4 \times \text{speed}$ (in km/h), rounded to the nearest 10 m.</p>

6.7 Device Installation and Removal

Device installation and removal must be carried out only by individuals who have suitable traffic management work experience or training. If flagging is required during installation and removal, then TCPs will need to be present to direct traffic.

Below is the Ministry's preferred approach for installing and removing temporary traffic control devices. The goal is to ensure that devices are installed efficiently, safely, and in the correct location with the correct spacing. There may be other methods which will also achieve this goal.

6.7.1 General Guidelines

1. It is important to develop the Traffic Control Plan before setting up signs and devices so that the appropriate distance is implemented between the work zone and the traffic control sign or device furthest upstream.
2. Flashing arrow boards, Traffic Control Persons, and/or flashing vehicle lights should be used during device installation and removal as required. Drivers may not expect to encounter workers on the roadway until devices are installed (see [Section 4.6: Flashing Arrow Boards \(FABs\)](#)).
3. More than one work vehicle may be used to install and remove devices.
4. When signs or channelizing devices are to be installed and removed several times during the work operation, the device locations may be marked so that the installation can be repeated quickly and with proper placement assured.
5. When not required, the devices should be stored off the roadway or out of sight.
6. Traffic Control Person Ahead C-001 signs shall remain in place until Traffic Control Persons are not actively controlling traffic.
7. Travelling against the flow of traffic is only permitted within a closed lane.
8. When setting up and removing devices, there is typically no speed reduction so the original posted speed limit of the roadway determines the need for shadow vehicles and crash attenuators.

For further guidance on the use of shadow vehicles when conducting traffic control device placement and/or removal, see [Section 10.3: Intermittently-Moving Work – Two-Lane, Two-Way Roadway](#) and [Section 10.5: Intermittently-Moving Work – Multilane Undivided or Divided Roadway](#).

6.7.2 Installation Considerations

1. If traffic speed is ≥ 70 km/h, a shadow vehicle with a 360-degree flashing light and 4-way flashers is recommended when installing traffic control devices. Position the shadow vehicle between the worker and the approaching traffic.
2. If the signs are not required immediately, turn them so that they are not visible to traffic until they are needed.
3. Cover any existing or conflicting signs on the roadway when the temporary signs are in effect.
4. A Traffic Control Person may be required for stopping traffic while channelizing devices are being placed around the work activity.
5. Ensure that signs and channelizing devices are visible to oncoming traffic. Adjust the signs as required.
6. Work may commence once all temporary traffic control devices are in place.

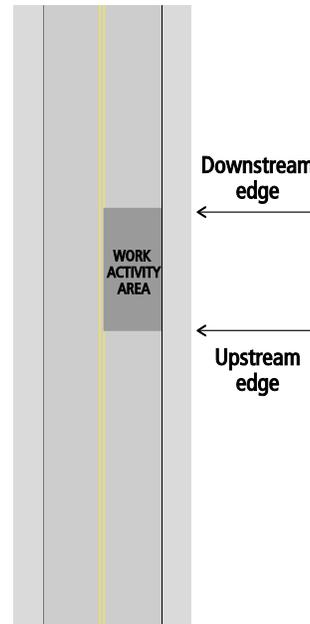
6.7.3 Removal Considerations

1. If the speed is ≥ 70 km/h, a shadow vehicle with a 360-degree flashing light and 4-way flashers is recommended when removing traffic control devices. Position the shadow vehicle between the worker and the approaching traffic.
2. Uncover any previously covered signs that are required for the two-way traffic.
3. In detour situations where vehicles have been directed to use alternative routes, remove upstream signage first to ensure that traffic has not been directed to an alternative route from which the signs have been partially removed.

6.7.4 Two-Lane, Two-Way Roadways

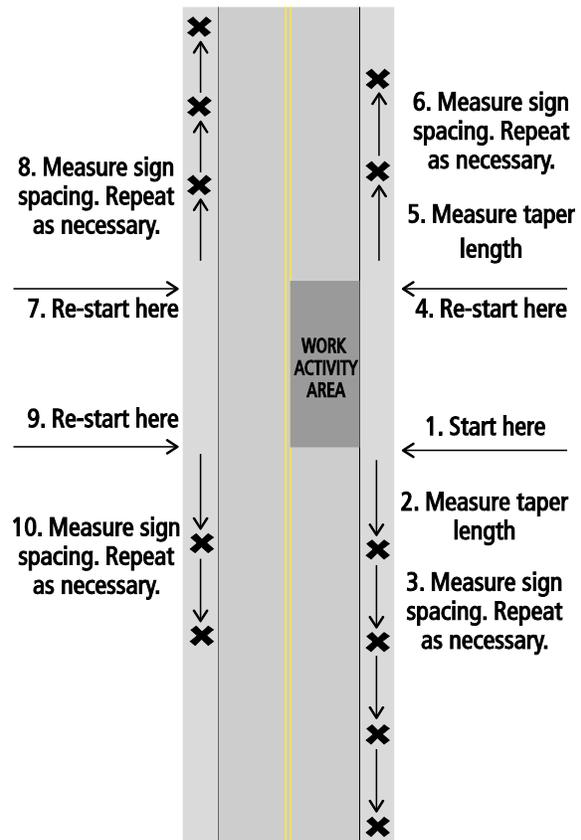
Step 1: Planning the Setup

1. Using the Traffic Control Plan, define the edges of the work activity area.
2. Mark the upstream and downstream edge of the work activity area.



Step 2: Determining the Layout

1. Mark sign and channelizing device placement in accordance with the Traffic Control Plan or Tables A and B (see [Section 6.6](#) or [Appendix F](#)).
 - Measurements may be made using a variety of methods (e.g., Distance Measuring Instrument, GPS, or manual measuring).
 - Marking may be done at the edge of pavement with survey stakes, paint, or other temporary markers.
 - Measure outward starting from the edge of the work activity area.
2. Follow sub-steps 1 through 10 as shown in the diagram on the right.

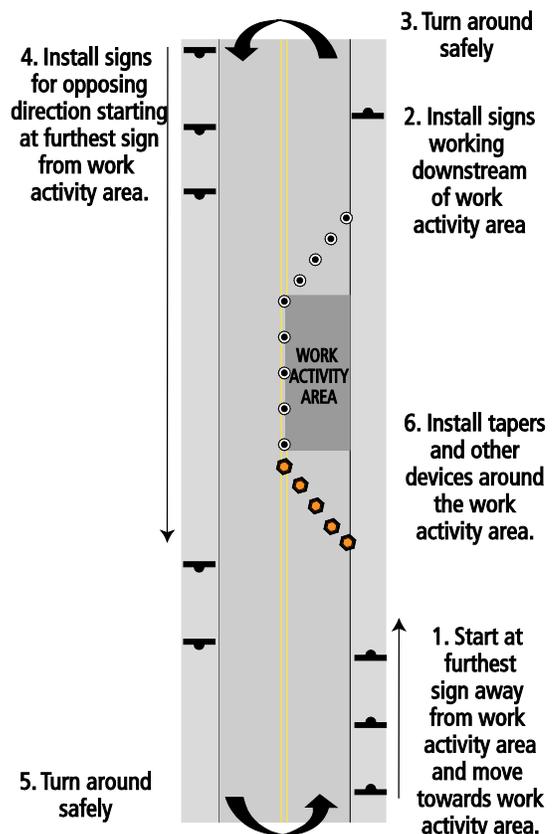


Step 3: Order of Installation

Traffic control devices should be placed in the order that drivers will encounter them, beginning with the sign or device furthest upstream from the work activity area and continuing forward. Typically, channelizing devices forming lane shifts, merges, detours, and other traffic pattern changes are established after the signs identifying the work zone are in place.

Using the diagram on the right:

1. Start at the furthest sign upstream and move towards the work activity area, placing signs in the locations previously marked and keeping as far to the right as possible.
 - Cover any existing conflicting signs.
2. Place signs for the termination area.
3. Pull off the road in an appropriate area to turn around and travel in the opposite direction.
4. Complete sign placement in the opposite direction, keeping as far to the right as possible.
 - Cover any existing conflicting signs.
5. Pull off the road in an appropriate area to turn around and travel in the opposite direction.
6. Place tapers and delineation around the work activity area.



Step 4: Planning the Removal

As soon as the traffic control devices are no longer needed, they should be removed. During the removal process, Traffic Control Persons, flashing arrow boards, shadow vehicles, and/or flashing vehicle lights should be used.

Signs and devices are removed in the opposite order of which they were installed. Traffic Control Person Ahead C-001 signs should remain in place until Traffic Control Persons are no longer needed.

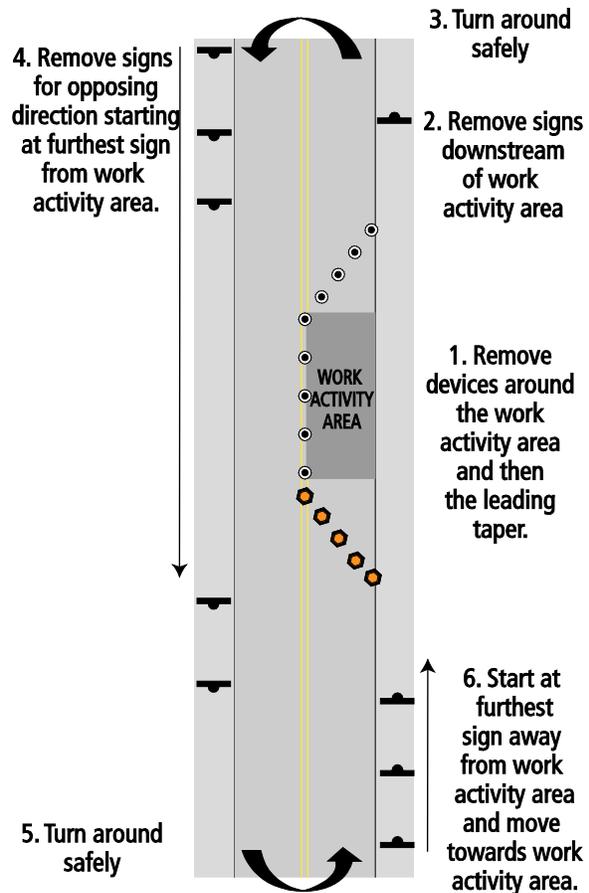
No worker should ride outside on the rear of a reversing vehicle. If special circumstances allow for this practice, it is mandatory to follow Section 16.31 in WorkSafeBC's Occupational Health and Safety Regulation (Rider Restriction).

Step 5: Order of Removal

Ensure that work operations have ceased, and that all equipment and workers are off the roadway.

Using the diagram on the right:

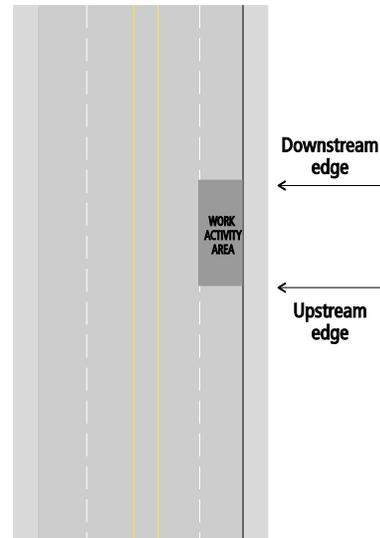
1. First remove channelizing devices on the travelled roadway. Do not remove advance warning signs until all other devices are removed.
 - Use a TCP to stop traffic, if required, and pull channelizing devices off the roadway, starting with those closest to the work on the downstream side and then moving to the upstream side. If necessary, place channelizing devices on the shoulder for storage and later pick-up.
2. Starting at the nearest sign downstream of the work activity area, remove or turn signs not in use, keeping as far to the right as possible.
 - Uncover any previously covered signs that are required for re-establishing normal traffic operations.
3. Pull off the road in an appropriate area to turn around and travel in the opposite direction.
4. Remove devices and remove or turn signs not in use in the opposite direction, keeping as far to the right as possible.
 - Uncover any previously covered signs that are required for re-establishing normal traffic operations.
5. Pull off the road in an appropriate area to turn around and travel in the opposite direction.
6. Remove the advance warning signs upstream of the work activity area.



6.7.5 Multilane Roadways

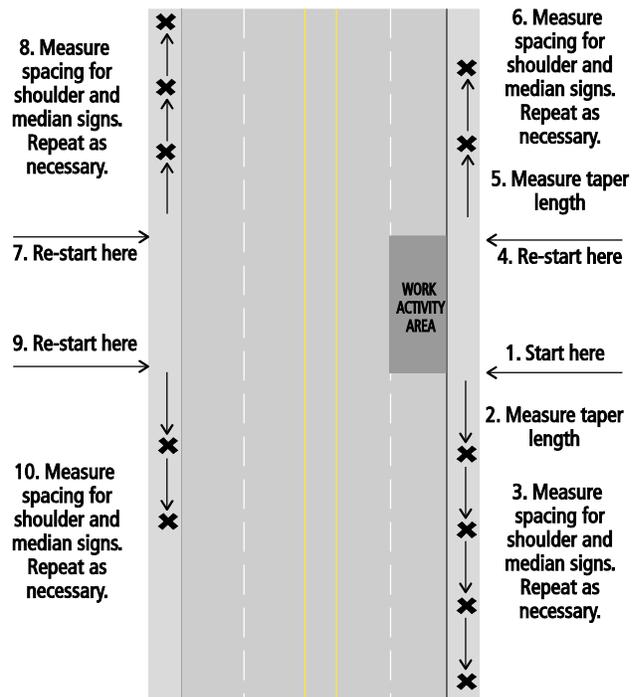
Step 1: Planning the Setup

1. Using the Traffic Control Plan, define the edges of the work activity area.
2. Mark the upstream and downstream edge of the work activity area.



Step 2: Determining the Layout

1. Mark sign and channelizing device placement in accordance with the Traffic Control Plan or Tables A and B (see [Section 6.6](#) or [Appendix F](#)).
 - Measurements may be made using a variety of methods (e.g., Distance Measuring Instrument, GPS, or manual measuring).
 - Measurements may be made on one side of the road for signs on both sides of the roadway.
 - Marking may be done at the edge of pavement with survey stakes, paint, or other temporary markers.
2. Follow sub-steps 1 through 10 as shown in the diagram on the right.



Step 3: Order of Installation

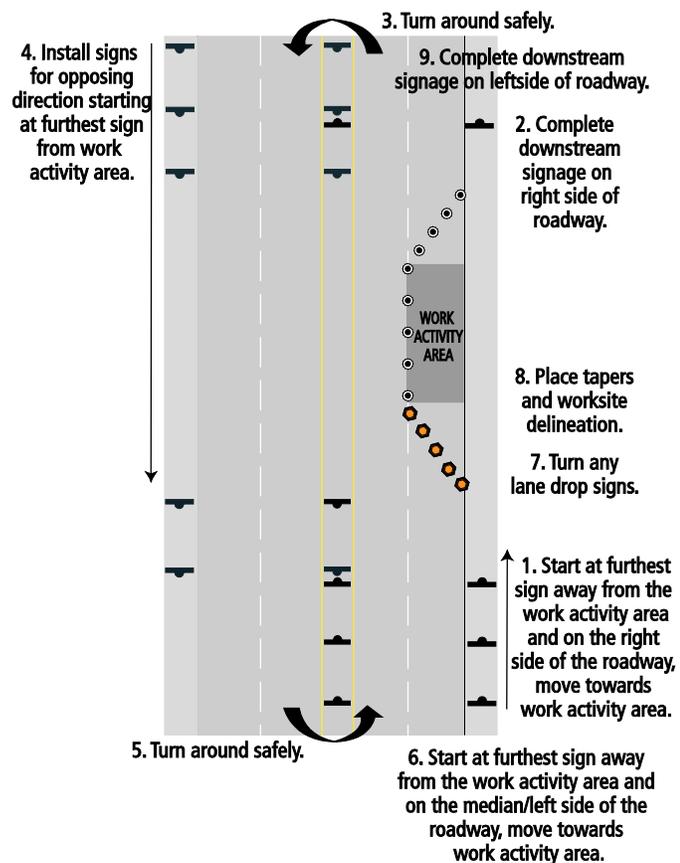
Traffic control devices should be placed in the order that drivers will encounter them, beginning with the sign or device farthest upstream from the work activity area and continuing towards the work area. Typically, channelizing devices forming lane shifts, merges, detours, and other traffic pattern changes are established after the signs identifying the work zone are in place.

In a multilane setup, regardless of which lane has the work activity area, the signs on the right side of the roadway should be installed first because drivers typically look to the right side for direction information.

Start upstream from the work area, on the right shoulder, and in the same direction as the flow of traffic, place signs in the previously marked locations. Keep as far off the travel lane as possible.

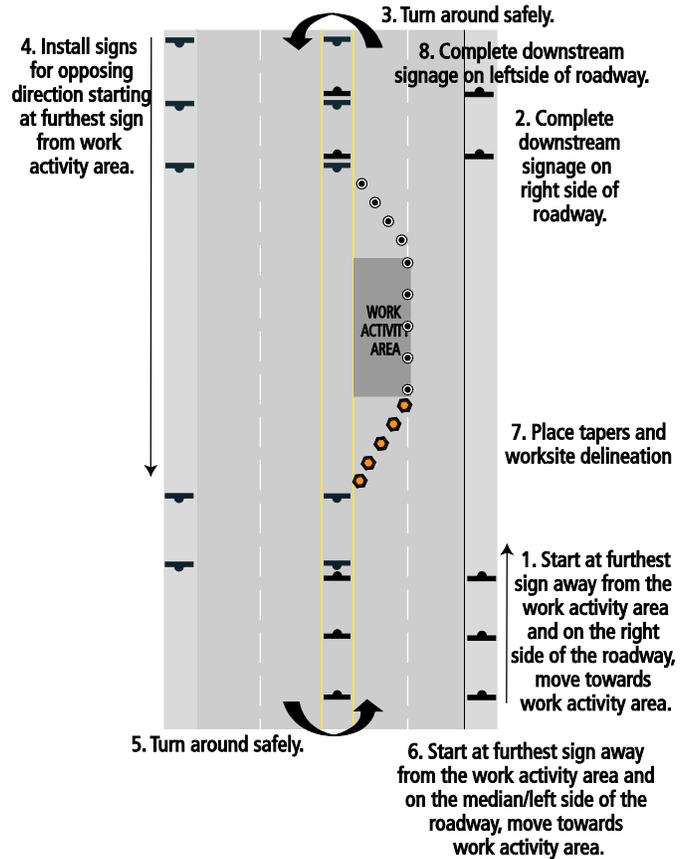
For a right lane closure:

1. Place the advance warning signs on the right shoulder, starting in advance of the work activity area.
 - When placing lane drop signs, keep them turned away from the view of traffic.
 - Cover any existing conflicting signs.
2. Place signs in the termination area.
 - Cover any existing conflicting signs.
3. Turn around using the next appropriate location downstream of the work area to travel in the opposite direction.
4. If signs and devices are required in the opposing direction, repeat items 1 and 2 in the opposite direction, starting in advance of the work activity area.
5. Travel to the next appropriate location upstream of the work area and in advance of the warning signs, and turn around.
6. On the left lane shoulder, set up all required signs for the work activity area, and cover any existing conflicting signs. Repeat sub-steps 3 and 4 as required.
7. Return to the right shoulder and turn the lane drop or directional signage.
8. Place tapers and delineation around the work activity area.
9. Install downstream signs on left side of roadway.



For a left lane closure:

1. Place the advance warning signs on the right shoulder, starting in advance of the work activity area.
 - Cover any existing conflicting signs.
2. Place the signs in the termination area.
 - Cover any existing conflicting signs.
3. Turn around using the next appropriate location downstream of the work area to travel in the opposite direction.
4. If signage and devices are required in the opposing direction, repeat items 1 and 2 in the opposite direction, starting in advance of the work activity area.
5. Travel to the next appropriate location upstream of the work area and in advance of the warning signage, and turn around.
6. On the median, set up all required signage for the work activity area, and cover existing conflicting signs.
7. Place tapers and delineation around the work activity area.
8. Install downstream signs on left side of roadway.



Step 4: Planning the Removal

As soon as the traffic control devices are no longer needed, they should be removed. During the removal process, Traffic Control Persons, flashing arrow boards, shadow vehicles, and/or flashing vehicle lights should be used.

Signs and devices are removed in the opposite order of which they were installed. Traffic Control Person Ahead C-001 signs should remain in place until Traffic Control Persons are no longer needed.

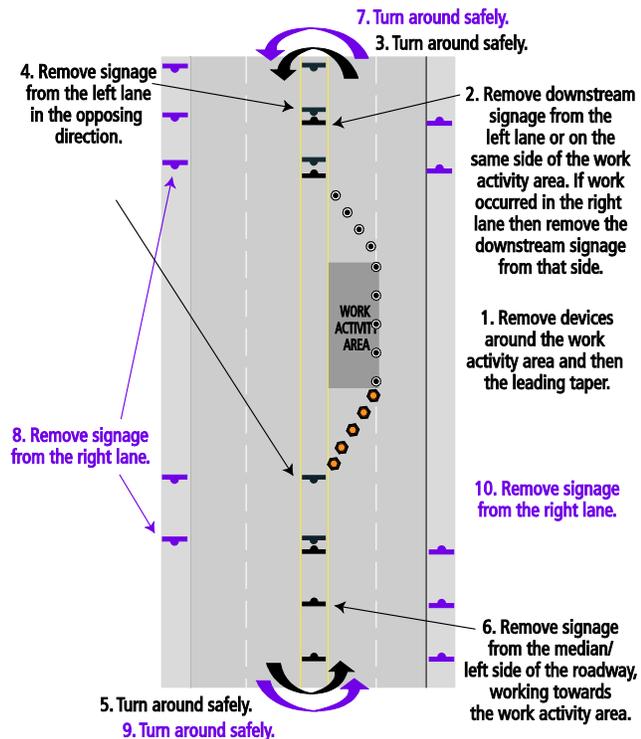
No worker should ride outside on the rear of a reversing vehicle. If special circumstances allow for this practice, it is mandatory to follow WorkSafeBC’s Occupational Health and Safety Regulations.

Step 5: Order of Removal

Ensure that work operations have ceased, and that all equipment and workers are off the roadway.

Using the diagram on the right:

1. First remove channelizing devices on the travel lane where the work has occurred. Do not remove advance warning signs until all other devices are removed.
 - Use a TCP to stop traffic, if required, or a buffer vehicle to maintain the closure and direct traffic into the other lane.
 - Pull channelizing devices off the roadway, starting with those closest to the work area on the downstream side and then moving to the upstream side. If necessary, place channelizing devices on the shoulder for storage and later pick-up.
2. Starting downstream of the work activity area, move with the flow of traffic on the same side of the roadway, keeping as far off the travel lane as possible. Pick up or turn signs that are not in use. Uncover any previously covered signs



3. Turn around using an appropriate location downstream of the work area.
4. Moving with the flow of traffic, remove signs and devices in the opposing direction. Remove or turn signs not in use on the median/left shoulder first (if they are set up there), and then remove those not in use on the right shoulder.
5. Turn around using an appropriate location.
6. Working towards the work activity area and moving with the flow of traffic, remove or turn signs not in use on the median/left shoulder. Uncover any previously covered signs.
7. Turn around using an appropriate location downstream of the work area.
8. Moving with the flow of traffic, remove or turn signage not in use on the right shoulder in the opposing direction. Uncover any previously covered signs.
9. Turn around using an appropriate location.
10. Moving with the flow of traffic, remove or turn any remaining signage on the right shoulder. Uncover any previously covered signs.

6.8 Inspection and Maintenance of Traffic Control

Traffic control devices shall be routinely inspected and maintained during both active and inactive work to ensure that they are not missing, and that they are clean, properly positioned, and effective in all weather and light conditions. Inspection and maintenance shall occur on all projects, regardless of size or complexity.

6.8.1 Responsibility for Inspection and Maintenance

Maintenance of traffic control is the responsibility of the Prime Contractor. Once the work zone is installed, it is important to ensure that it functions as intended, and that any subsequent modifications resulting from an inspection process are documented, implemented and maintained.

For each project, an individual shall be assigned supervisory responsibility for establishing and maintaining traffic control. On construction projects, the Prime Contractor shall designate a specific person (or persons) to assume these responsibilities. Possible candidates for this role include:

- Site Supervisor/Foreman/Superintendent
- Traffic Control Manager
- Traffic Control Supervisor
- Traffic Control Person

Lines of communication and responsibility should be clearly established between individuals in charge of routine maintenance of traffic control devices and those with greater authority so that, when necessary, problems can be brought promptly to the attention of personnel or authorities who are in a position to respond immediately.

6.8.2 Elements of Inspection and Maintenance

Inspection and maintenance of traffic control should include:

- devices are installed as per the traffic control plan
- review sign and device placement, condition, cleanliness, height, offset
- review of the functionality of the traffic control layouts during day and night and in all weather conditions
- all hazards within the work zone are addressed and mitigated
- traffic control devices no longer need are covered or removed

Maintenance, servicing, or replacement of temporary traffic control devices and equipment may be required due to:

- traffic incidents
- damage caused by construction activities
- dead/low flashing light batteries or burned out bulbs
- low fuel levels for electrical generators
- weather damage, wear and tear
- dirt on devices
- vandalism or theft

6.8.3 Field Inspection Frequency

The frequency of field inspections should be based on the following:

- project size and duration
- nature of the work activity
- complexity of traffic control
- frequency at which damage occurs
- number of problems observed in previous inspections

Traffic control that is required and left in place overnight should be inspected during hours of darkness.

Inspections should be continued day and night and through holidays, weekends, and other times when work is not active.

6.9 Work Duration

Work duration is the length of time work occupies one or multiple locations. It is a major factor in determining the number and types of temporary traffic control devices to be used in a work activity area.

There are five types of work based on work duration:

1. **Emergent work** is work that occurs when an unanticipated situation or event is discovered during travel or work. It can be carried out in less than 5 minutes. This does not include emergencies, which are situations which require immediate response to save lives or prevent serious injury using whatever resources are available
2. **Brief-duration work** is generally planned work that requires a quick response and can be carried out in less than 15 minutes.
3. **Mobile work** is continuously slow-moving work or intermittently-moving work, with short stops of 30 minutes or less. The traffic control devices for mobile work are typically vehicle-mounted.
4. **Short-duration work** occurs when a work operation occupies one location for more than 15 minutes during a single daylight period.
5. **Long-duration work** is planned construction work that occupies one location for more than one daylight period. Night work lasting more than 15 minutes is also considered long-duration work.

6.10 Risk Evaluation for Emergent and Brief-Duration Work

Emergent and brief-duration work may have limited advance warning because of the type of work being done and the limited duration of that work.

Layouts specific to emergent work and brief-duration work are provided in:

- [Section 7: Traffic Control Layouts – Two-Lane, Two-Way Roadways](#)
- [Section 8: Traffic Control Layouts – Multilane Undivided Roadways](#)
- [Section 9: Traffic Control Layouts – Multilane Divided Roadways](#)

Other layouts such as those for short-duration and long-duration work may also be used if appropriate.

A **Risk Evaluation** shall be performed using [Table C – Risk Evaluation for Emergent or Brief-Duration](#) (see next page or [Appendix F](#)) to determine if emergent or brief-duration work is permissible. If emergent or brief-duration work is not permissible, other layouts should be considered to complete the work.

TABLE C – RISK EVALUATION FOR EMERGENT OR BRIEF-DURATION WORK												
Risk Evaluation Category	Risk Criteria	Criteria Met?										
1. Work Duration	Can the work be completed in 5 minutes or less?	Yes / No										
2. Sight Distance Distance from parked location to furthest point that can be seen on the road.	For the posted speed limit, is the minimum sight distance met? <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Speed Limit (km/h)</th> <th>50 - 70</th> <th>80 - 90</th> <th>100 - 110</th> <th>120</th> </tr> </thead> <tbody> <tr> <th>Minimum Sight Distance (m)</th> <td>100</td> <td>170</td> <td>250</td> <td>300</td> </tr> </tbody> </table>	Speed Limit (km/h)	50 - 70	80 - 90	100 - 110	120	Minimum Sight Distance (m)	100	170	250	300	Yes / No
Speed Limit (km/h)	50 - 70	80 - 90	100 - 110	120								
Minimum Sight Distance (m)	100	170	250	300								
3. Traffic Volume	Is the traffic volume in lanes that will be entered by workers estimated to be less than 5 vehicles per lane per minute?	Yes / No										
4. Environmental Conditions	Is visibility unrestricted (no fog, blowing snow, etc.) and are road conditions not slippery?	Yes / No										

RISK EVALUATION REVIEW
<p>The Risk Evaluation has three possible outcomes:</p> <ol style="list-style-type: none"> Answers to all risk criteria questions are Yes: Traffic control devices may be installed in accordance with the appropriate Emergent Work traffic control layout. Answers to one or two risk criteria questions are No: Traffic control devices may be installed in accordance with the appropriate Brief-Duration Work traffic control layout. Answers to three or more risk criteria questions are No: Additional traffic control measures are required beyond those described and illustrated for Emergent and Brief-Duration Work. The standard layout(s) for the appropriate short-duration, long-duration, or mobile work should be applied.

6.11 Using Sections 7 to 19

The traffic control layouts in Sections 7 to 19 are generally the **minimum** required. These layouts do not represent every work activity that could occur on the roadway. Standards may be modified using expert judgment. The principles outlined in this manual shall always be followed.

6.11.1 Information in Sections 7 to 19

Sections 7 to 19 provide the following information about traffic control layouts:

- basic traffic control principles, situations, and methods
- prescribed traffic control standards for work zones
- guidance and options related to the prescribed standards

Each section begins with a general description which applies to the layouts.

6.11.2 Application of Sections 7 to 19

1. Descriptions on the Left

The descriptions on the left provide the layout information:

Purpose: Intended use of the layout.

Standard: Uses words such as **shall, required, must** - describes a mandatory condition. For provincial highways, if a mandatory condition cannot be met, contact [Traffic and Highway Safety Engineering - Policy and Standards](#) for direction.

Guidance: Uses words such as **should, recommended** - describes a recommended, but not mandatory, practice. Decisions contrary to guidance are required to be documented (example of “should” documentation can be found on the next page).

The primary information to be documented by the Prime Contractor include:

- What is the decision?
- When was it made?
- Why was it made?
- Who made it?
- Other information may be included and may vary based on the scope of the change(s).

Options: Uses words such as **may** - describes a permissive condition. It is optional and carries no requirement or recommendation.

“SHOULD” DOCUMENTATION

The following is an example of written documentation for not following a “should” condition.

Scenario

A Contractor was completing a survey on the shoulder for only a couple hours. The Contractor requested permission to install construction signs on only one side of the road (shoulder) even though median barrier and/or depressed median was available at the location to place signs. On multilane highways where median barrier exists, Ministry guidelines state that signs should be placed.

The Contractor’s justification was they were only going to be out in the field for a single day, working only on the shoulder and right-of-way, during the daytime, for a length of a couple (2-3) hours. The Contractor was of the opinion that installation of the signs themselves (on the median) increases worker exposure and road user exposure to risks. That in itself would not have been enough justification for the Ministry to accept their traffic management plan proposal. However, combined with the type of work, location, and duration, for what amounted to a very short period of time, especially when the work did not impact available lanes for vehicle movements, the Ministry agreed and accepted their proposal.

Documentation

The Contractor provided the following details in their “should” documentation:

- 1) Summary of proposal/request
- 2) Project name, location and date of proposed work
- 3) Overview of work to be completed and explanation of scenario
- 4) Justification of request including the following details:
 - Survey work
 - Shoulder work only
 - One-time occurrence
 - Day time work
 - Only 2-3 hours on shoulder
 - Installing signs on the median has risks in itself to both workers and road users during the period of time signs being installed and removed. Lane travel was not impacted by Contractor’s survey work taking place on shoulder, and Ministry right-of-way.
- 5) Contact person

2. Diagrams on the Right

The diagrams on the right show all standards associated to the traffic control layout. There will be information in the diagram that is not described.

6.11.3 General Instructions for Using the Layouts in Sections 7 to 19

1. The diagrams are not drawn to scale. [Table A – Taper Lengths](#) and [Table B – Device Spacing Lengths](#) shall be used to determine appropriate spacing dimensions.
2. Most of the layouts may be used for both day-time and night-time work.
3. Lighting locations are not shown in the diagrams but Traffic Control Persons shall be illuminated with overhead lighting at night.
4. To determine the appropriate sign size and lateral placement for the roadway, see [Section 4.2: Traffic Signs](#).
5. Speeds on regulatory signs are shown as “XX” to allow for various speeds.
6. The layouts show only one set of advance signage in each direction. See [Section 6.4 Queue Management](#) for more information.
7. Some road features, sight lines, intersections, and other conditions may make it necessary to adjust sign spacing. In these cases, signs should be placed in the most reasonable location that provides good visibility for drivers and enough time for them to make appropriate adjustments.
8. Buffer spaces may not be identified in all the layouts. Where space allows and it is considered desirable, a buffer space should be included, even when it is not indicated on the typical layout or in the Traffic Control Plan.

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PART B – TRAFFIC CONTROL

Section 7: Traffic Control Layouts – Two-Lane, Two-Way Roadways

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PART B – TRAFFIC CONTROL

Section 7: Traffic Control Layouts – Two-Lane, Two-Way Roadways

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

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7.1 General Information – Two-Lane, Two-Way Roadways

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign shall be used.
- For long-duration work, a Construction Ahead C-018-1A sign shall be used.
- Where the speed limit is ≥ 70 km/h, a buffer space shall be used.
- All work, buffer, and shadow vehicles shall be equipped with a 360-degree flashing light and 4-way flashers.

Guidance:

- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.

Options:

- Where cyclists are regularly observed using the shoulder, a Share the Road W-132-1 sign may be used with an appropriate cycling hazard tab (see [Section 18: Traffic Control Layouts – Bicycle Lanes](#) for additional information).
- A portable dynamic message sign (DMS) may be used to provide advance messaging for drivers.
- In low speed (≤ 60 km/h) urban areas (within municipal boundaries), customization of traffic control layouts, including closer device spacing and shorter taper lengths, may be necessary to maintain access and mobility. In these cases, document why adjustments are being made.

7.2 Typical Construction Speed Zone Signing – Two-Lane, Two-Way Roadway

Purpose:

Construction speed limits are regulatory speeds established in Construction Speed Zones within long-term construction and maintenance project areas where there are continuous hazards for motorists or where workers are in close proximity to active travel lanes.

Construction Speed Zones should be applied prudently because **overuse reduces effectiveness**. Drivers should be able to perceive the need to reduce speed.

Standard:

- Conflicting speed limit signs within the Construction Speed Zone shall be covered or removed.
- The same Construction Speed Zone signing is required in opposing directions.

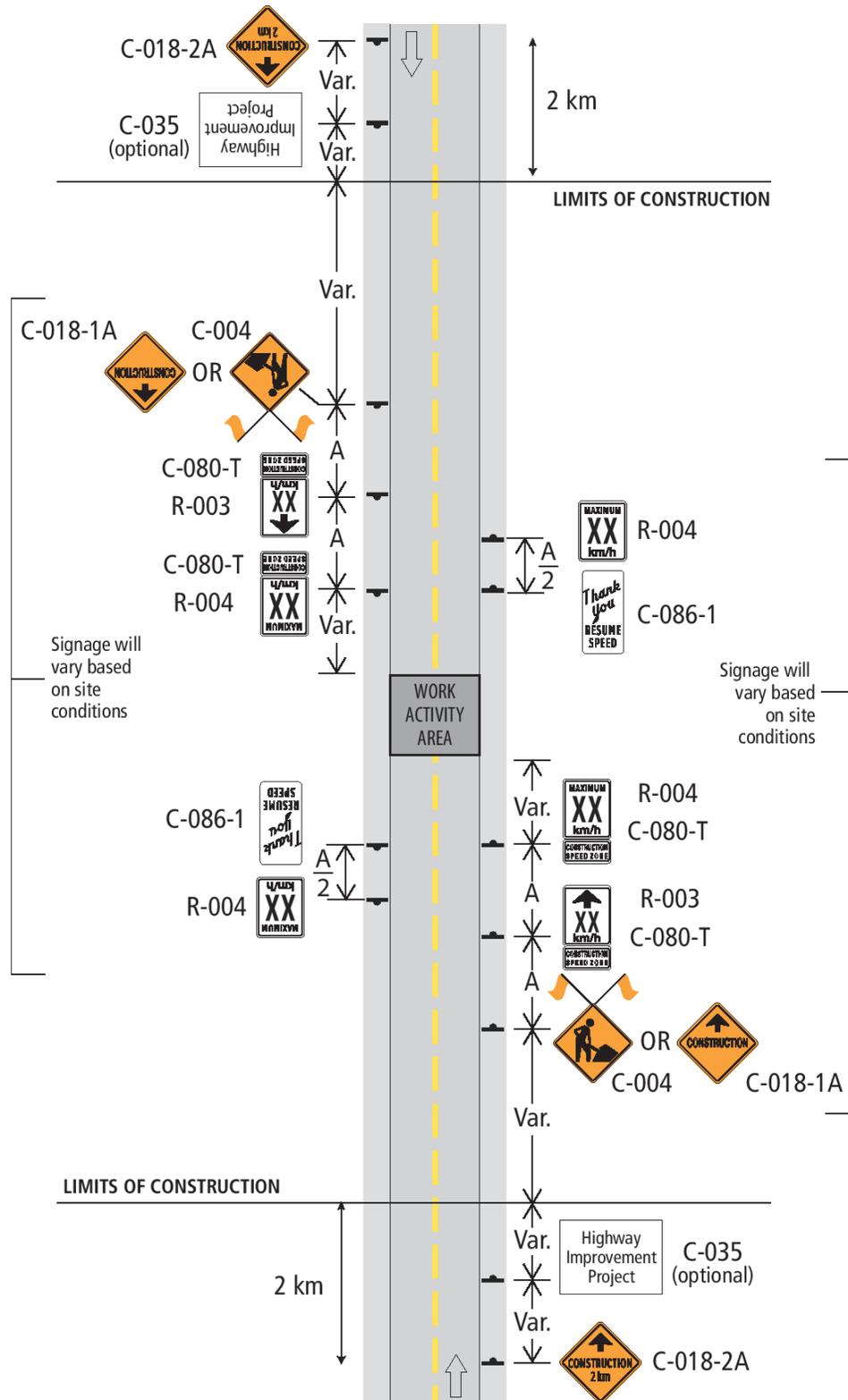
Guidance:

- The Maximum Speed R-004 sign with a Construction Speed Zone C-080-T distance tab should be positioned at the beginning of the active work area.
- Construction speed limit signs should be covered or removed when no work is occurring and other hazards are not present.
- It is important to record when construction speed limits are installed and covered/removed.
- See also [Section 2.4: Management of Speed](#) for information on using Construction Speed Zones.

Options:

- Use of the Construction Project C-035 sign is project-dependent. It is typically used only for large projects. See [Appendix B: Standard Construction Signs](#) for information on using this sign.
- If secondary signs are applied, they should be installed on the left side of the highway.
- The positioning of secondary signs depends on the space available:
 - If the median is more than 2 metres wide, secondary signs may be placed in the median.
 - If the median is less than 2 metres wide, secondary signs may be placed on the opposite shoulder.

Figure 7.2: Typical Construction Speed Zone Signing – Two-Lane, Two-Way Roadway



7.3 Emergent Work (<5 Minutes) – Two-Lane, Two-Way Roadway

Purpose:

Emergent work involves very short-duration activities for which setting up and taking down temporary traffic control devices may take more time than the actual work, and expose workers to greater risk. Each entry onto the travelled portion of the roadway lasts less than 1 minute, and the total time to complete the task is less than 5 minutes.

This does not include emergencies, which are situations which require immediate response to save lives or prevent serious injury using whatever resources are available.

It may occur when an unanticipated situation or event—one that presents a risk to the travelling public—is discovered during travel or work activities. It can be considered unplanned, urgent maintenance work. A Traffic Control Plan is not required for emergent work.

Emergent work may include the removal of debris from the roadway (e.g., tree limbs, lost cargo, dead animals, tire and other vehicle debris, and the manual removal of rock). Isolated pothole patching—patching 1 or 2 potholes in a 1-kilometre section of road—may be considered emergent or brief-duration work. However, it is mobile work when the work crew has to stop several times in succession within a 1-kilometre section to patch multiple potholes.

Standard:

- A risk evaluation is required to determine whether or not the work activity is considered emergent (see [Table C – Risk Evaluation for Emergent or Brief-Duration Work](#) in [Section 6.10](#) or [Appendix F](#)).
- The entire work activity shall be completed in less than 5 minutes.
- The work vehicle shall use a flashing arrow board (FAB) in caution mode or a 360-degree flashing light and 4-way flashers.

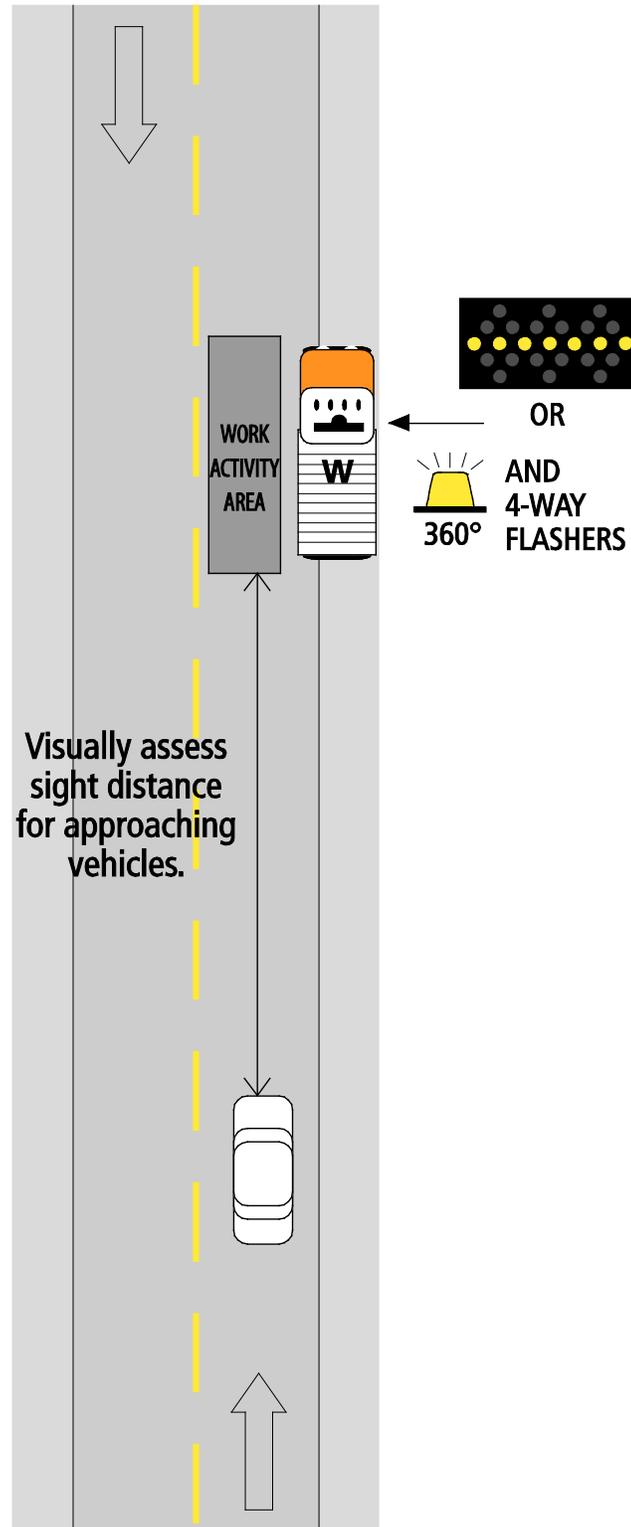
Guidance:

- If a dynamic message sign (DMS) or flashing arrow board (FAB) is used for an operation on the shoulder, it should be set to caution mode.
- The position of the work vehicle in relation to the work area may be adjusted based on the available sight distance, shoulder/off-roadway conditions, and work being performed.

Options:

- None at this time.

Figure 7.3: Emergent Work – Two-Lane, Two-Way Roadway



7.4 Brief-Duration Work (<15 Minutes) – Two-Lane, Two-Way Roadway

Purpose:

Brief-duration work is generally planned, although the exact location or extent of the work required may not be fully known. It requires less than 15 minutes to complete.

Brief-duration work may include:

- locating drainage structures or other roadway features or components
- cleanup of material spills and removing debris from the roadway (e.g., small fallen trees, larger tree limbs, crash debris, etc.)
- quick repairs intended as a partial or temporary response to damage or failure

If the work is expected to last more than 15 minutes, additional resources will be needed to implement a short-duration work zone. The work should be delayed until the appropriate work zone equipment and devices are available.

Isolated pothole patching—patching 1 or 2 potholes in a 1-kilometre section of road—may be considered emergent or brief-duration work. However, it is mobile work when the work crew has to stop several times in succession within a 1-kilometre section to patch multiple potholes.

Standard:

- A Crew Working Ahead C-004 is required in advance of the work.
- A risk evaluation is required to determine whether or not the work activity is considered brief (see [Table C – Risk Evaluation for Emergent or Brief-Duration Work](#) in [Section 6.10](#) or [Appendix F](#)).
- The work activity shall be completed in less than 15 minutes.
- The work vehicle shall use a flashing arrow board (FAB) in caution mode or a 360-degree flashing light and 4-way flashers.

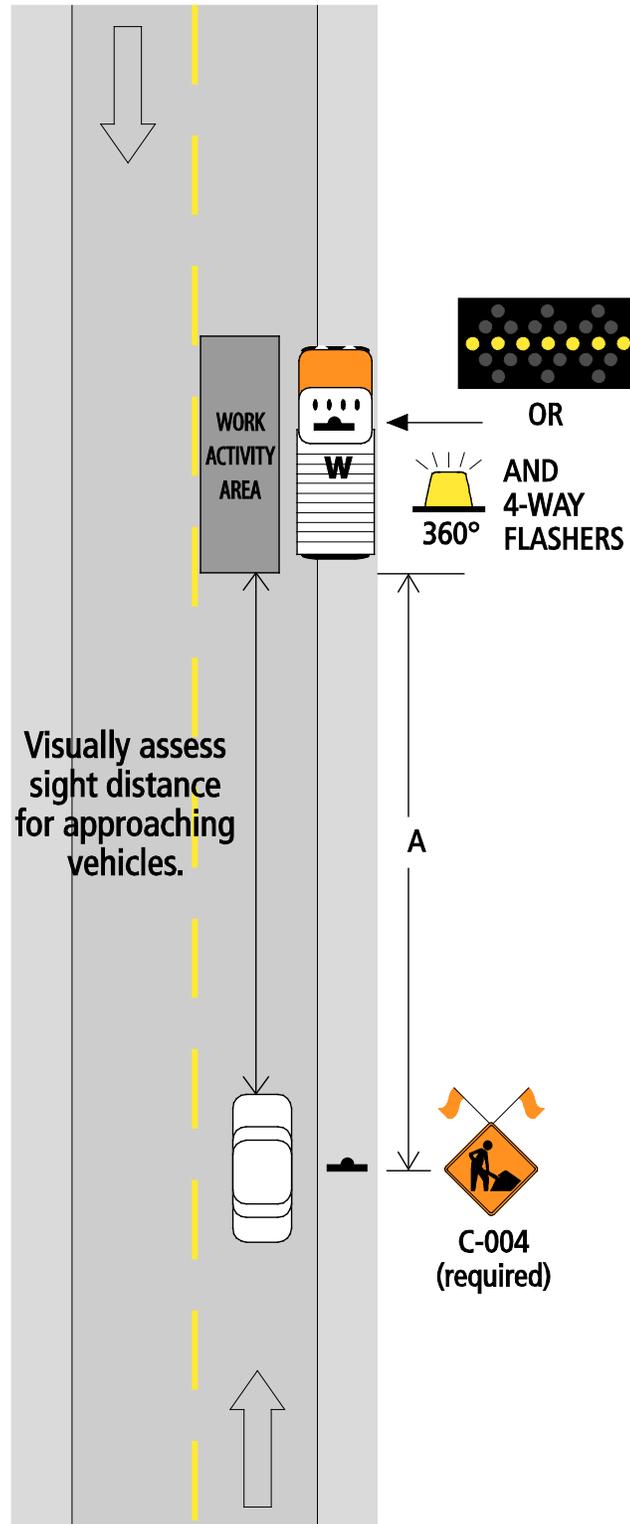
Guidance:

- If a dynamic message sign (DMS) or flashing arrow board (FAB) is used for an operation on the shoulder, it should be set to caution mode.
- The position of the work vehicle in relation to the work area may be adjusted based on the available sight distance, shoulder/off-roadway conditions, and the work being performed.

Options:

- None at this time.

Figure 7.4: Brief-Duration Work – Two-Lane, Two-Way Roadway



7.5 Work on Shoulder – Short and Long Duration

Purpose:

Stationary work on the shoulder takes place outside the travel lanes but occupies part or all of the shoulder area.

If shoulder work encroaches into a travel lane, a full lane closure may have to be implemented.

Standard:

- When work is in progress and workers are present, a flashing arrow board (FAB) in caution mode is required in the taper or immediately in advance of the work area.
- Barricades are required at each end of the work activity area for long-duration work.

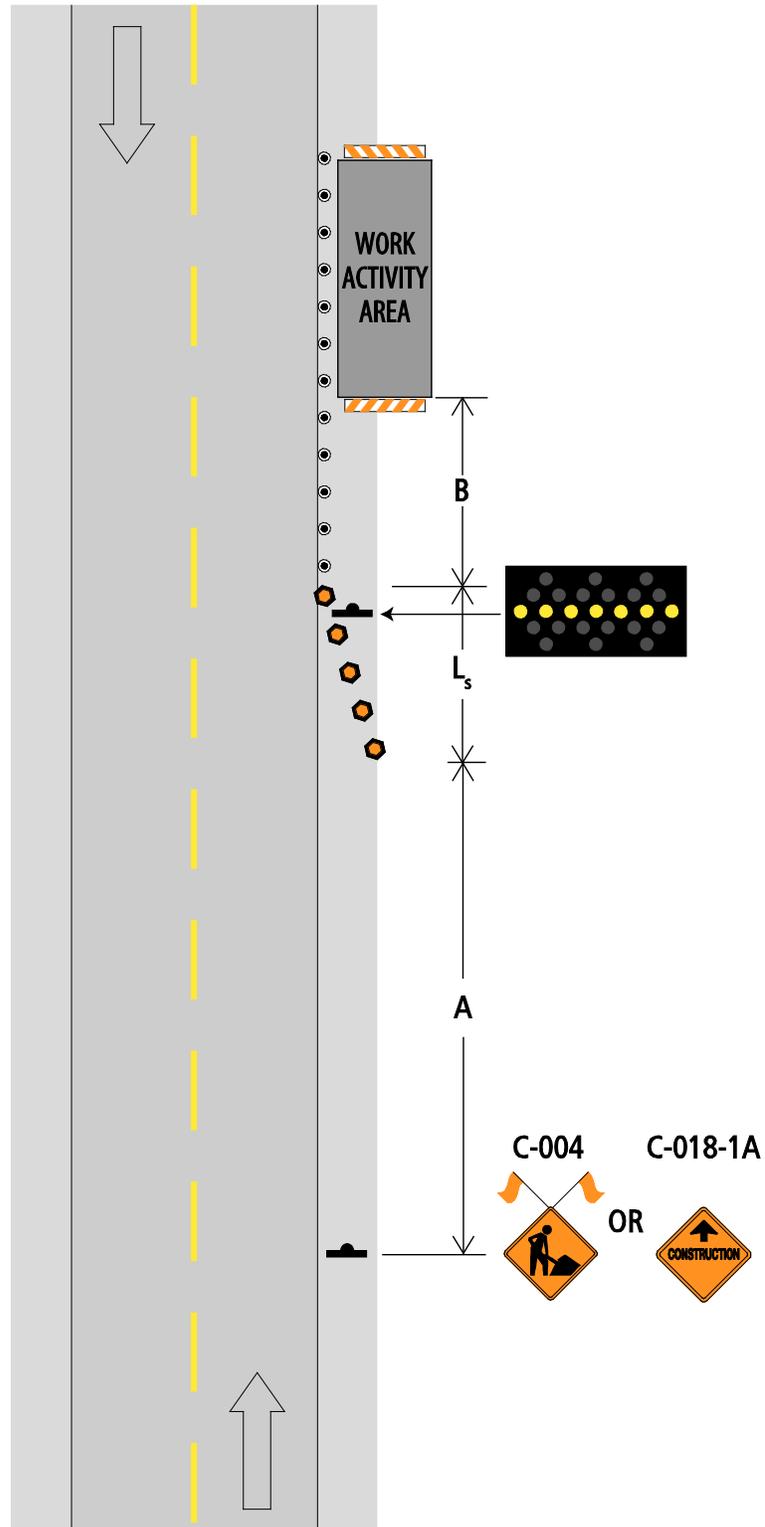
Guidance:

- When work is not in progress but the work area has not been cleared, care should be taken to isolate it from the travelled lane.

Options:

- Advance warning signs may be installed in the opposing direction of travel.
- If the speed limit is ≤ 60 km/h, or there is insufficient room, tubular markers may replace drums for the taper.
- The channelizing devices used alongside the work area may be tubular markers or cones.
- Advance warning signs may be omitted for short-duration work if a shadow vehicle displays a vehicle-mounted dynamic message sign (DMS) or flashing arrow board (FAB) in caution mode.

Figure 7.5: Work on Shoulder – Short and Long Duration



7.6 Work in Parking Lane – Urban Area

Purpose:

This layout is used where a parking lane is closed for construction or maintenance activities.

Standard:

- Advance warning signs shall not be obscured by vehicles or other devices.
- If the parking lane is normally open to vehicle travel at various times of day (such as rush hour) and closed to vehicle travel during other times of the day, the lane shall be considered a travel lane, not a parking lane, and a lane closure shall be implemented.

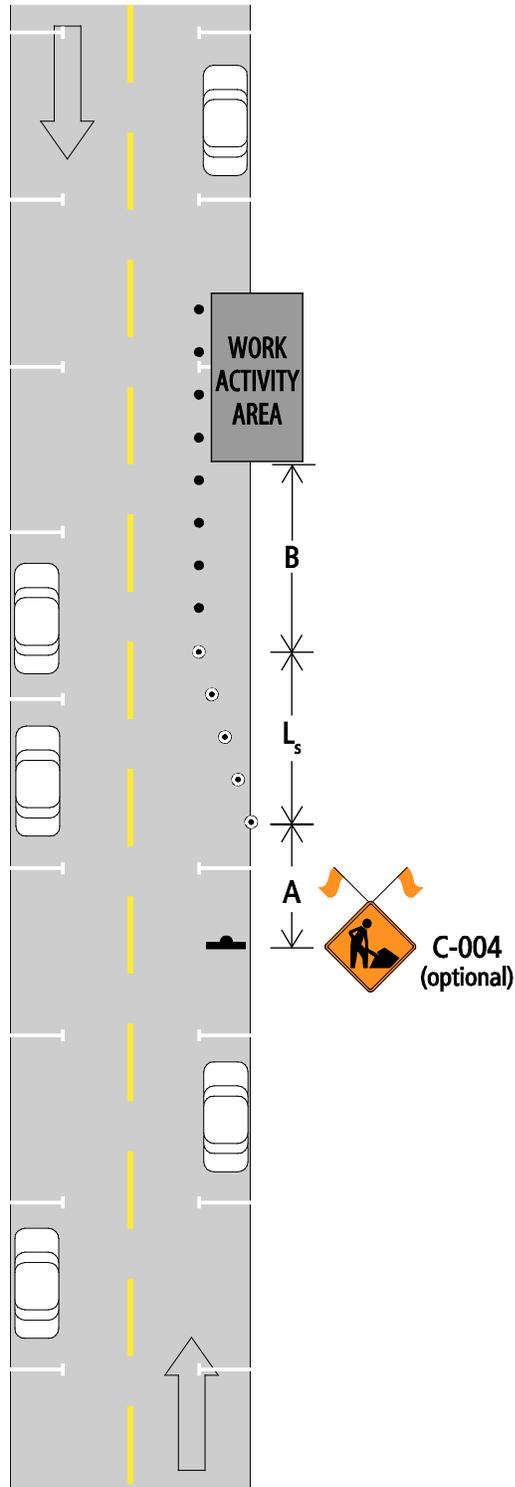
Guidance:

- The closed parking area should be delineated with cones or tubular markers.
- Advance notice of the parking restriction should be installed to ensure an unoccupied work activity area, and may include:
 - covering parking meters;
 - installing no parking signs; and/or
 - using cones to cordon off the area.

Options:

- The Crew Working Ahead C-004 sign may be used within the parking lane if space allows, or placed on the sidewalk as long as it does not impede pedestrians.
- A work vehicle may be parked in advance of the work activity area with a flashing arrow board (FAB).

Figure 7.6: Work in Parking Lane – Urban Area



7.7 Roadside Work – Encroachment into Travel Lane – Short Duration

Purpose:

This layout shows a typical setup on a low-speed (≤ 60 km/h), low-volume roadway where work encroaches into the travelled portion of the roadway but sufficient space remains for vehicles to pass the works within their own lanes.

A low-volume roadway is one on which the total roadway volume is $<1,000$ vehicles per day. Traffic volumes may be obtained from the local Road Authority.

For higher-speed roadways, the options are to create a lowered Construction Speed Zone or to implement a lane closure.

Standard:

- At least 3 metres of width shall be maintained for each travel lane.
- Single lane alternating setup shall be used if at least 3 metres of width cannot be maintained for each travel lane.

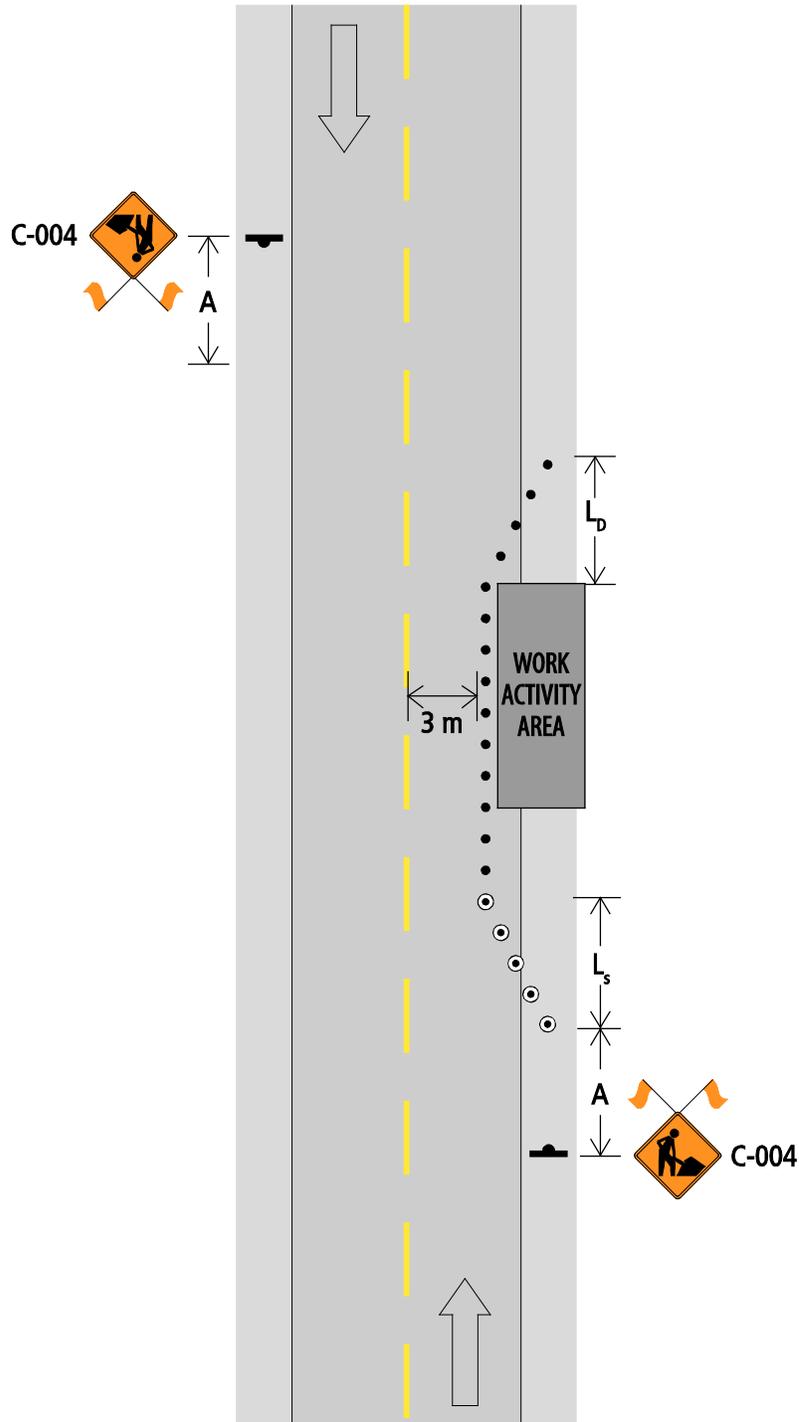
Guidance:

- None at this time.

Options:

- Additional advance warning may be appropriate, such as a Road Narrows C-134 sign between the Crew Working Ahead C-004 sign and the taper.
- The taper and channelizing devices may be omitted if a shadow vehicle with flashing arrow board (FAB) in caution mode is used.
- If the opposite shoulder is suitable for carrying vehicular traffic and at least 3 metres of width can be maintained for each travel lane, the centreline may be shifted by using closely-spaced channelizing devices.

Figure 7.7: Roadside Work – Encroachment into Travel Lane – Short Duration



7.8 Lane Closure with TCPs – Single Lane Alternating – Short and Long Duration

Purpose:

This layout shows the appropriate positions of TCPs when they are directing traffic for a lane closure on a two-lane, two-way roadway.

Standard:

- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.
- When used at night, the TCP station shall be illuminated with overhead lighting.
- Barricades are required at each end of the work activity area for long-duration work.

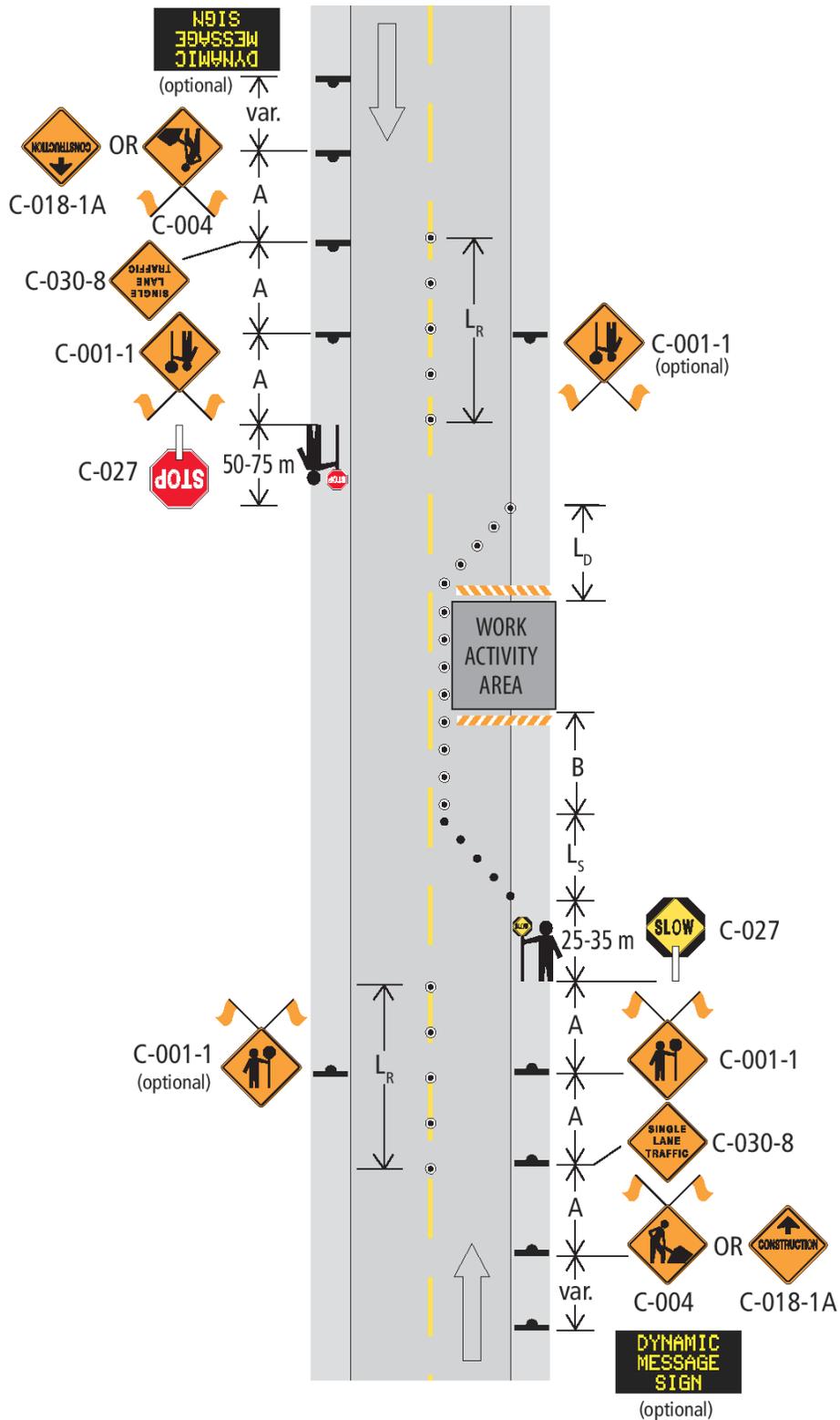
Guidance:

- The distance between the TCP and the Traffic Control Person Ahead C-001-1 sign should not exceed 150 metres.
- Where Crew Working – Maximum Speed C-002-2 signs establish a Temporary Speed Zone, the C-002-2 should be placed upstream of the C-004 or C-018-1A.
 - Thank You Resume Speed C-086-1 signs should be placed across from the Crew Working – Maximum Speed C-002-2 signs in the opposing lanes.

Options:

- An additional Traffic Control Person Ahead C-001-1 sign may be added to the far side of the road to provide queued drivers with increased awareness of the TCP position.
- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- A Prepare to Stop C-029 sign may replace the Single Lane Traffic C-030-8 sign for other applications that require traffic to stop (e.g., equipment crossing road).
- Run-in delineation, L_R may be omitted during period where queues are low, permitting the full release of the queue in each direction.

Figure 7.8: Lane Closure with TCPs – Single Lane Alternating – Short and Long Duration



7.8.1 Lane Closure with TCPs – Single Lane Alternating with Speed Reduction (Construction Speed Limit ≤ 50 km/h)

Purpose:

This layout shows the signs used and the appropriate positions of TCPs when they are directing traffic for a lane closure on a two-lane, two-way roadway. This layout should be used when there is a speed reduction and the construction speed limit is ≤ 50 km/h.

Construction speed limits are regulatory speeds established in Construction Speed Zones within long-term construction and maintenance project areas where there are continuous hazards for motorists or where workers are in close proximity to active travel lanes.

Construction Speed Zones should be applied prudently because **overuse reduces effectiveness**. Drivers should be able to perceive the need to reduce speed.

Standard:

- Conflicting speed limit signs within the Construction Speed Zone shall be covered or removed.
- When used at night, the TCP station shall be illuminated with overhead lighting.
- Barricades are required at each end of the work activity area for long-duration work.

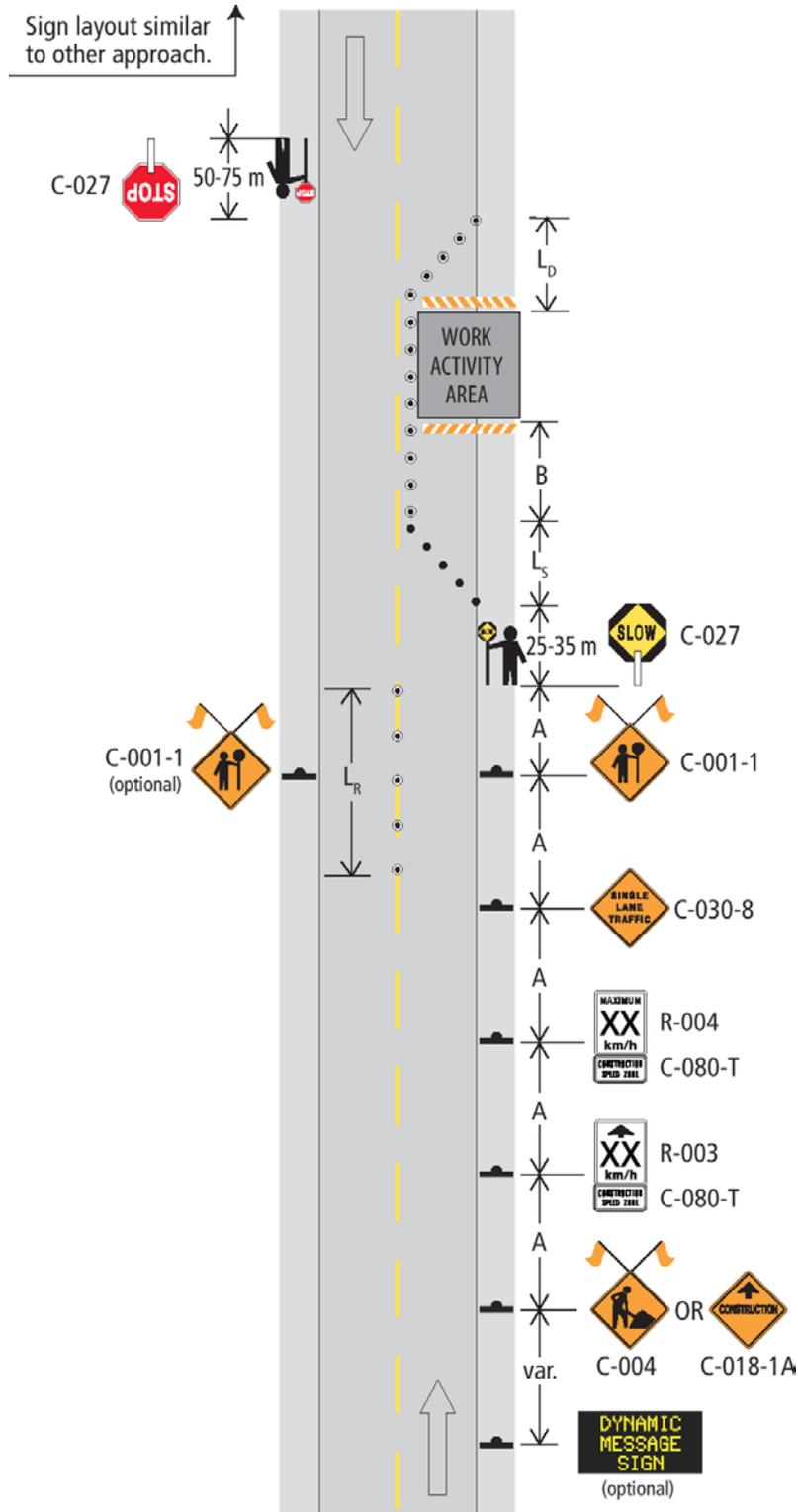
Guidance:

- The distance between the TCP and the Traffic Control Person Ahead C-001-1 sign should not exceed 150 metres.
- Construction speed limit signs should be covered or removed when no work is occurring and other hazards are not present.
- It is important to record when construction speed limits are installed and covered/removed.
- Where Crew Working – Maximum Speed C-002-2 signs establish a Temporary Speed Zone, the C-002-2 should be placed upstream of the C-004 or C-018-1A.
 - Thank You Resume Speed C-086-1 signs should be placed across from the Crew Working – Maximum Speed C-002-2 signs in the opposing lanes.

Options:

- An additional Traffic Control Person Ahead C-001-1 sign may be added to the far side of the road to provide queued drivers with increased awareness of the TCP position.
- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- A Prepare to Stop C-029 sign may replace the Single Lane Traffic C-030-8 sign for other applications that require traffic to stop (e.g., equipment crossing road).
- If secondary signs are applied, they should be installed on the left side of the highway.
- Run-in delineation, LR may be omitted during period where queues are low, permitting the full release of the queue in each direction.

**Figure 7.8.1: Lane Closure with TCPs – Single Lane Alternating with Speed Reduction
(Construction Speed Limit ≤ 50 km/h)**



7.8.2 Lane Closure with TCPs – Single Lane Alternating with Speed Reduction (Construction Speed Limit \geq 60 km/h)

Purpose:

This layout shows the signs used and the appropriate positions of TCPs when they are directing traffic for a lane closure on a two-lane, two-way roadway. This layout should be used when there is a speed reduction and the construction speed limit is \geq 60 km/h.

Construction speed limits are regulatory speeds established in Construction Speed Zones within long-term construction and maintenance project areas where there are continuous hazards for motorists or where workers are in close proximity to active travel lanes.

Construction Speed Zones should be applied prudently because **overuse reduces effectiveness**. Drivers should be able to perceive the need to reduce speed.

Standard:

- When TCPs are directing traffic, the construction speed limit shall be \leq 70 km/h.
- Conflicting speed limit signs within the Construction Speed Zone shall be covered or removed.
- When used at night, the TCP station shall be illuminated with overhead lighting.
- Barricades are required at each end of the work activity area for long-duration work.

Guidance:

- The distance between the TCP and the Traffic Control Person Ahead C-001-1 sign should not exceed 150 metres.
- Construction speed limit signs should be covered or removed when no work is occurring and other hazards are not present.
- It is important to record when construction speed limits are installed and covered/removed.
- Where Crew Working – Maximum Speed C-002-2 signs establish a Temporary Speed Zone, the C-002-2 should be placed upstream of the C-004 or C-018-1A.
 - Thank You Resume Speed C-086-1 signs should be placed across from the Crew Working – Maximum Speed C-002-2 signs in the opposing lanes.

Options:

- An additional Traffic Control Person Ahead C-001-1 sign may be added to the far side of the road to provide queued drivers with increased awareness of the TCP position.
- The Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- A Prepare to Stop C-029 sign may replace the Single Lane Traffic C-030-8 sign for other applications that require traffic to stop (e.g., equipment crossing road).
- If secondary signs are applied, they should be installed on the left side of the highway.
- Run-in delineation, LR may be omitted during period where queues are low, permitting the full release of the queue in each direction.

7.9 Lane Closure with AFADs – Short and Long Duration

Purpose:

This layout shows the use of Automated Flagger Assistance Devices (AFADs) when they are used to control traffic for a lane closure on a two-lane, two-way roadway.

Standard:

- When used at night, the AFAD station shall be illuminated with overhead lighting.
- A black-on-white STOP HERE ON RED or STOP HERE ON RED SIGNAL sign shall be installed on the right side of the approach at the point where drivers are expected to stop. It may be installed on the AFAD device itself.
- When AFADs are used, the construction speed limit shall be ≤ 70 km/h.

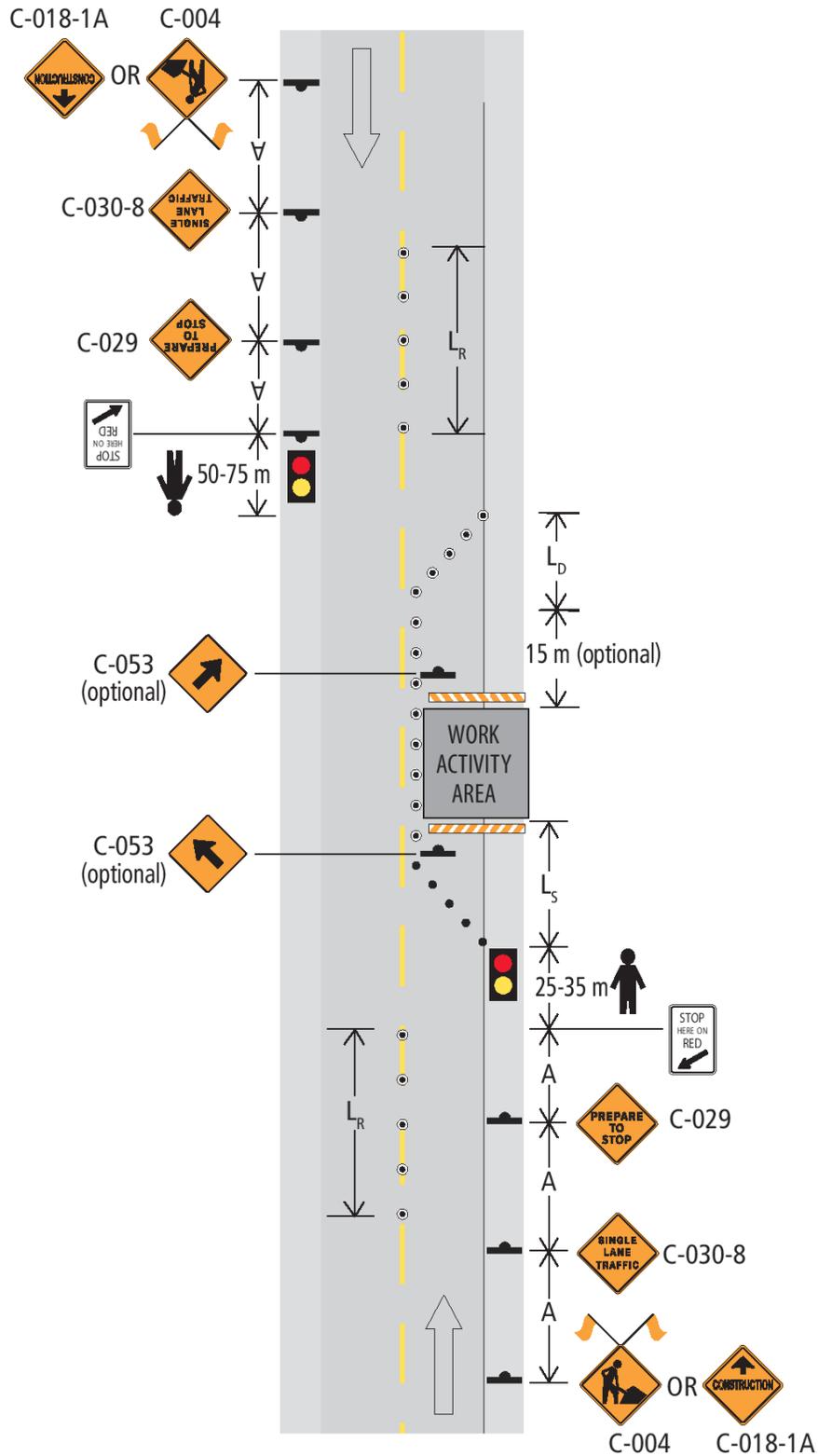
Guidance:

- Where Crew Working – Maximum Speed C-002-2 signs establish a Temporary Speed Zone, the C-002-2 should be placed upstream of the C-004 or C-018-1:
 - Thank You Resume Speed C-086-1 signs should be placed across from the Crew Working – Maximum Speed C-002-2 signs in the opposing lanes.

Options:

- A Prepare to Stop C-029 sign may replace the Single Lane Traffic C-030-8 for applications other than single lane alternating traffic where traffic is required to stop (e.g., equipment crossing road).
- Lane Closure Arrow C-053 signs may be added upstream and downstream of the work activity area to direct traffic into the correct lanes.
- Run-in delineation, L_R may be omitted during period where queues are low, permitting the full release of the queue in each direction.

Figure 7.9: Lane Closure with AFADs – Short and Long Duration



7.10 Lane Closure with Temporary Signals – Single Lane Alternating – Short and Long Duration

Purpose:

This layout shows the appropriate placement of temporary traffic signals when they are required to control traffic for a lane closure on a two-lane, two-way roadway.

Standard:

- Temporary traffic control signals shall be installed and operated in accordance with [Section 4.8: Portable Traffic Signals](#).
- Signal timing and signal head locations shall be established by qualified personnel.
- Advance warning shall include a Signal Ahead C-112 sign and a Single Lane Traffic C-030-8 sign.
- An overhead advance warning W-012 sign, with flashers, shall be used in advance of the stop bar in speed zones ≥ 70 km/h or as required by the Road Authority.
- A Stop Line Here R-025-R sign is required to advise drivers of where to stop.
- Barricades are required at each end of the work activity area for long-duration work.

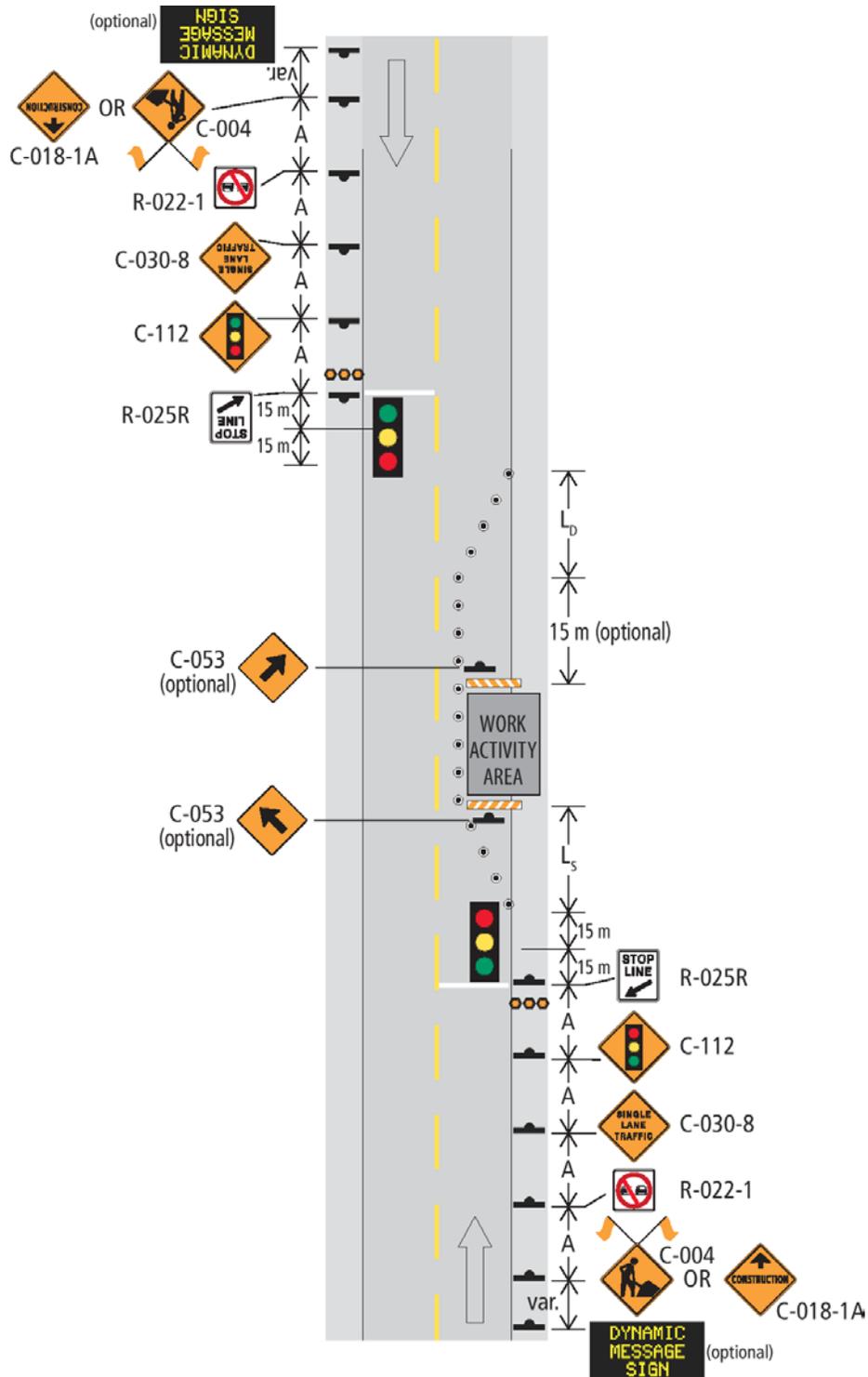
Guidance:

- Inspection of the portable traffic signal (PTS) should occur at least once daily and should include, at minimum, checking the traffic operation (vehicle delay and throughput), signal alignment, power supply, and evidence of vandalism.
- Flexible drum delineators should be placed on the approach side of the portable traffic signal (PTS) to provide notification and protection for road users, including cyclists.

Options:

- Lane Closure Arrow C-053 signs may be added upstream and downstream of the work activity area to direct traffic into the correct lanes.
- A Passing Permitted R-023 sign may be used when traffic exits the work zone.
- A stop bar may be installed to accompany the Stop Line Here R-025-R sign when possible, especially for long duration work taking place over several days. Removable pavement markings may be used to establish the stop bar.

Figure 7.10: Lane Closure with Temporary Signals – Single Lane Alternating – Short and Long Duration



7.11 Work on Low-Volume Roadway – No Centreline – Short Duration

Purpose:

This layout shows a typical setup on a low-volume roadway where work encroaches into the travelled portion of the roadway but sufficient space remains for vehicles to pass the works within their own lanes.

A low-volume roadway is one on which the total roadway volume is <1,000 vehicles per day. Traffic volumes may be obtained from the local Road Authority.

Standard:

- A 5.5 m minimum roadway width shall be maintained.

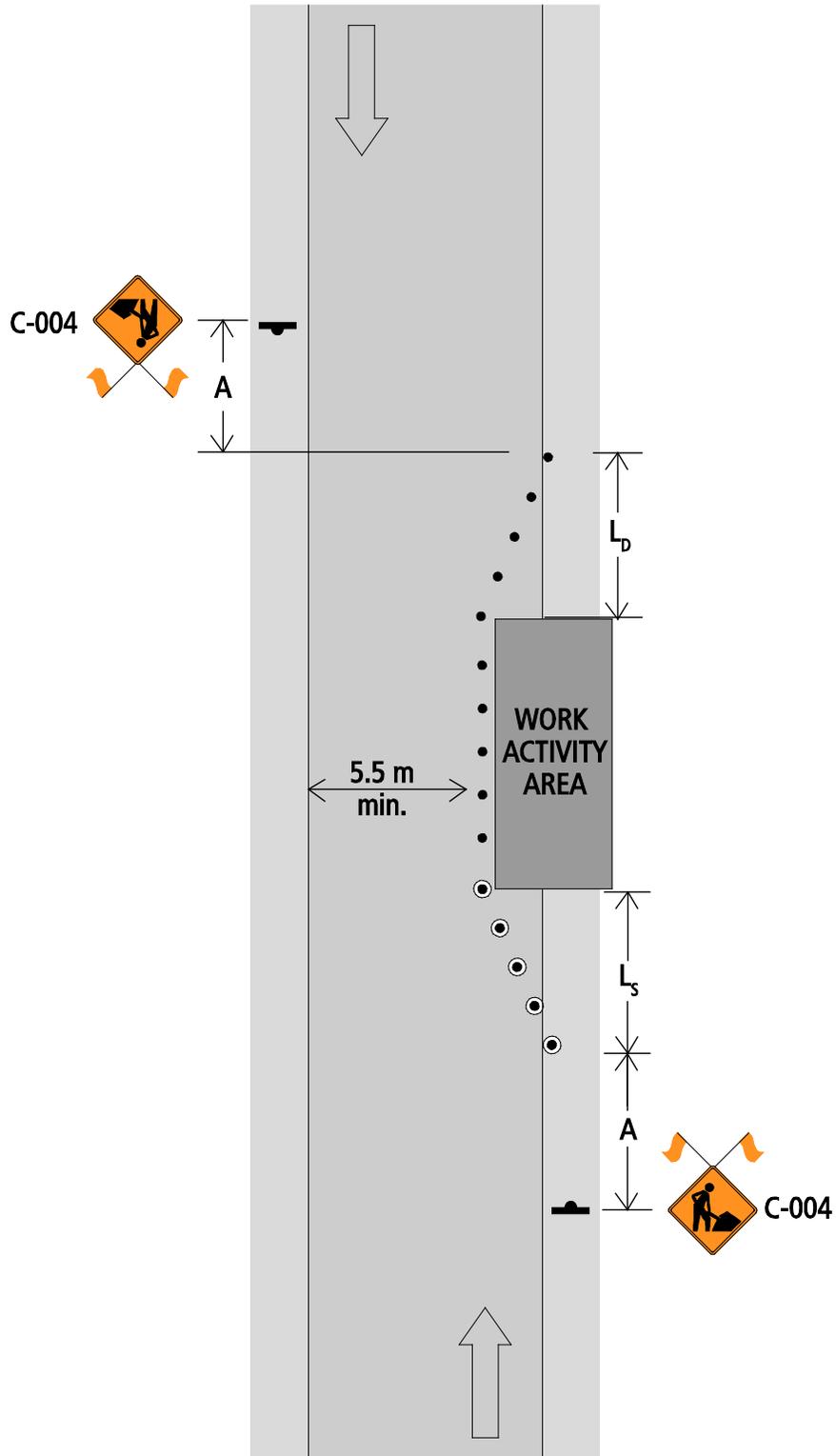
Guidance:

- Any stopped work vehicle should keep as far right as practicable by using shoulder space whenever possible.
- For speeds ≥ 70 km/h, a buffer space should be used.

Options:

- For speeds ≤ 60 km/h, tubular markers may be used instead of drums for leading tapers, and cones may be used instead of tubular markers for other channelizing devices.
- A vehicle-mounted dynamic message sign (DMS) or a flashing arrow board (FAB) in caution mode may be positioned within the taper.

Figure 7.11: Work on Low-Volume Roadway – No Centreline – Short Duration



7.12 Work on Low-Volume Roadway – No Centreline – Long Duration

Purpose:

This layout shows a typical setup on a low-volume roadway where work encroaches into the travelled portion of the roadway but sufficient space remains for vehicles to pass the works within their own lanes.

A low-volume roadway is one on which the total roadway volume is <1,000 vehicles per day. Traffic volumes may be obtained from the local Road Authority.

Standard:

- A Road Narrows Ahead C-134 sign is required for both directions of travel.
- A Flashing Arrow Board (FAB) is required if workers are present.
- Barricades are required at each end of the work activity area for long-duration work.

Guidance:

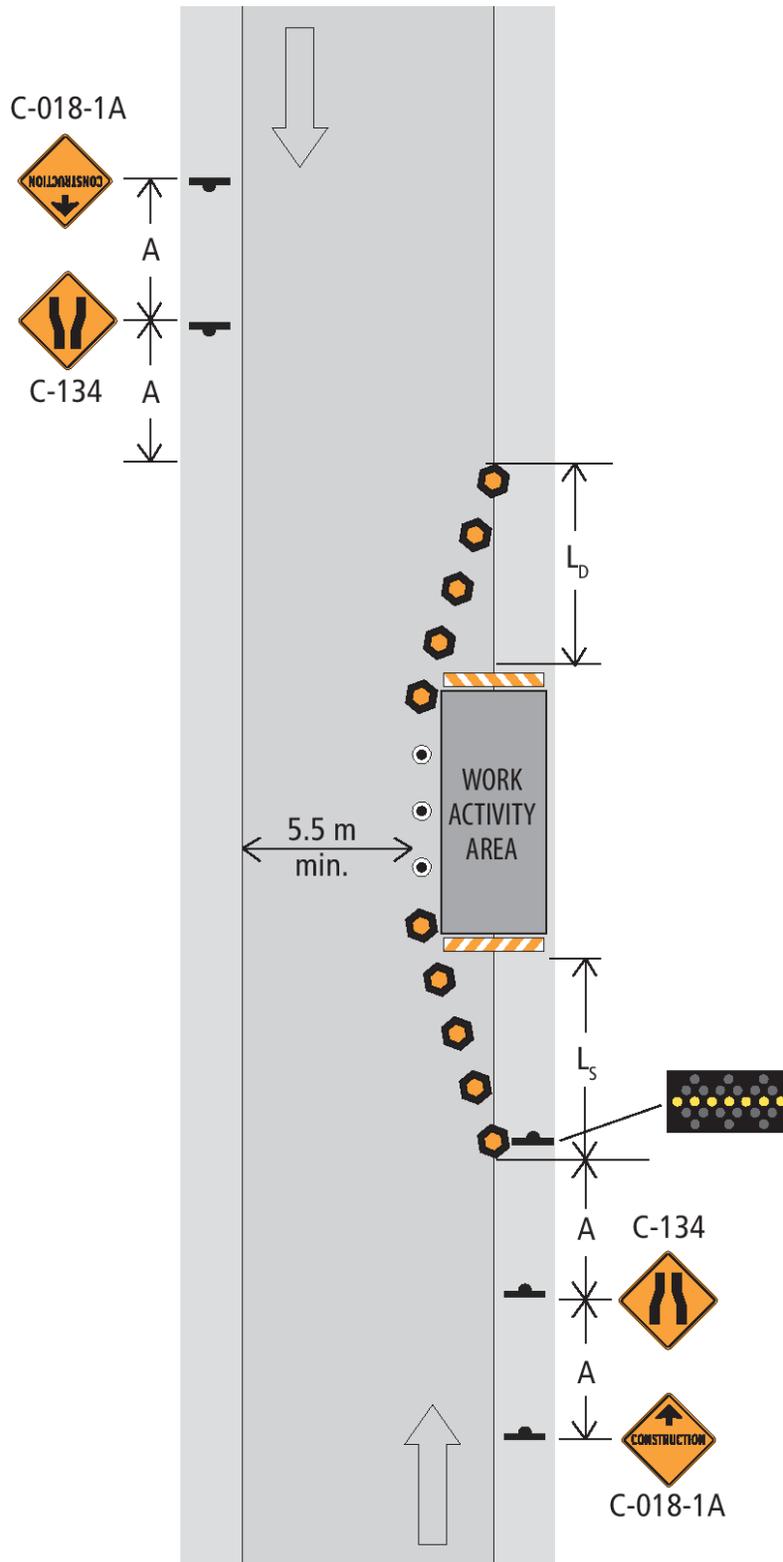
- If the opposite shoulder is suitable for carrying vehicles and at least 3.5 metres of space can be maintained for each travel lane, a lane shift may be implemented using the appropriate Lane Shift C-117-L/R signs.
- Any stopped work vehicle should keep as far right as practicable by using shoulder space whenever possible.

Options:

- The flashing arrow board (FAB) may be replaced as shown below.

	Workers or Work Vehicles Present	No Workers or Vehicles Present
Day	360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign.
Night	Use flashing arrow board (FAB).	Type A yellow warning lights on barricades and drums.

Figure 7.12: Work on Low-Volume Roadway – No Centreline – Long Duration



7.13 Two-Way Left-Turn Lane Closed – Short and Long Duration

Purpose:

This layout shows the typical setup for the closure of a two-way left-turn lane. If the work will encroach into either travel lane, a left lane closure for the affected lane(s) should be considered.

Standard:

- A flashing arrow board (FAB) in caution mode is required for each direction of travel.
- Barricades are required at each end of the work activity area for long-duration work.

Guidance:

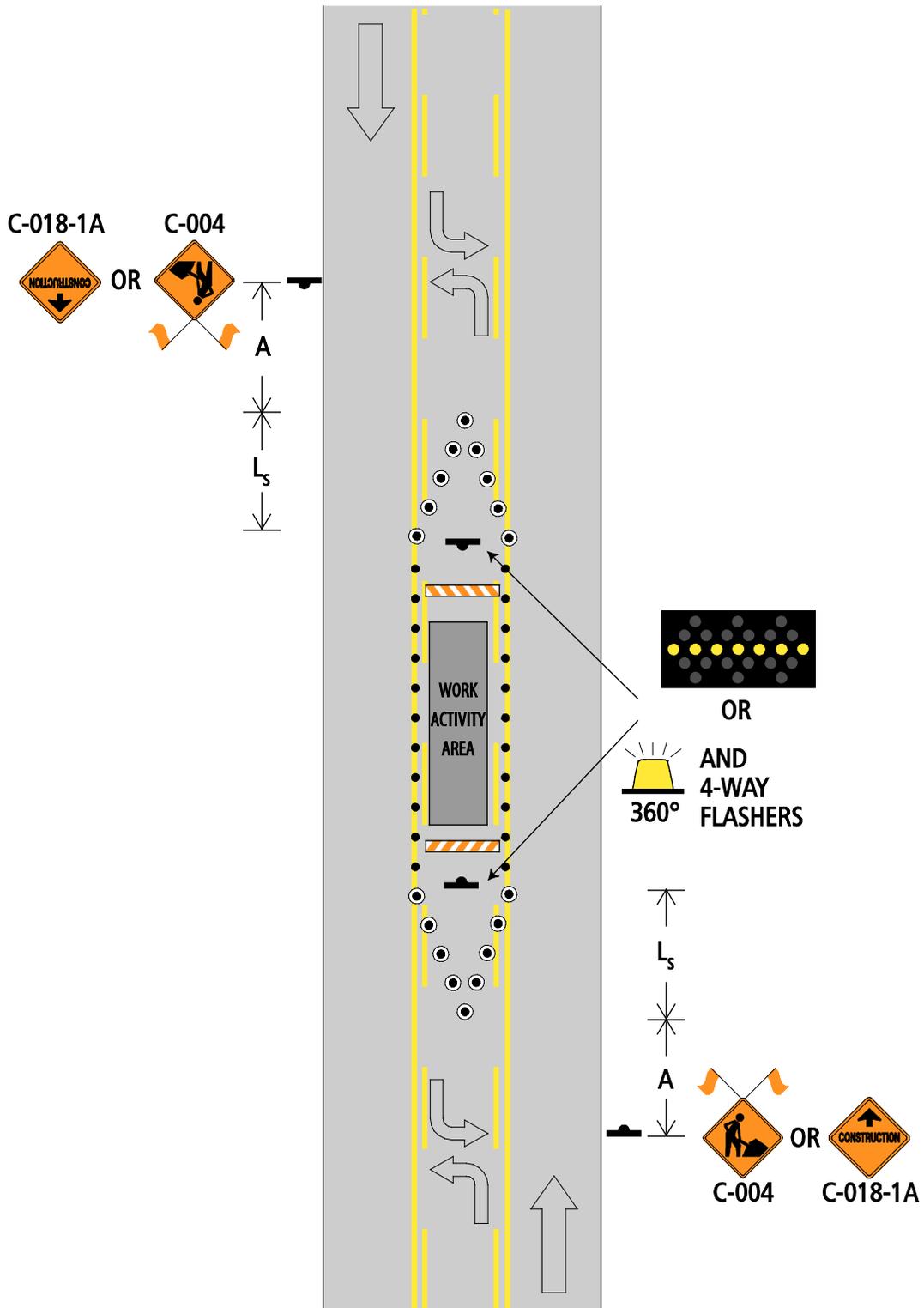
- Left-turning movements should be prohibited along the work activity area and taper.

Options:

- Depending on the nature of the work, one or both adjacent lanes may also have to be closed.
- For speeds ≤ 60 km/h, cones instead of tubular markers may be used to channelize traffic.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning lights.
≥ 70 km/h	No substitution.	

Figure 7.13: Two-Way Left-Turn Lane Closed – Short and Long Duration



7.14 Roadside Diversion – Long Duration

Purpose:

A roadside diversion provides a new alignment around the work area, typically adjacent to the original alignment.

Standard:

- A Road Diversion Ahead C-052-L/R sign shall be used in advance of the diversion to note the direction of the new alignment.
- Pavement markings no longer applicable to the traffic pattern of the roadway shall be covered, removed, or eradicated.
- If the diversion is paved, temporary pavement markings are required to mark the centreline (see [Section 4.4: Pavement Markings](#)).
- If the diversion is gravel, a Pavement Ends C-149 sign is required in advance of the graveled portion.
- Type 3 barricades shall be used to mark the closed portion of the roadway, with a Road Closed C-030-6A sign and a Detour Right C-006-R marker mounted on the barricades.
- The edges of the diversion shall be defined using channelizing devices or barriers.

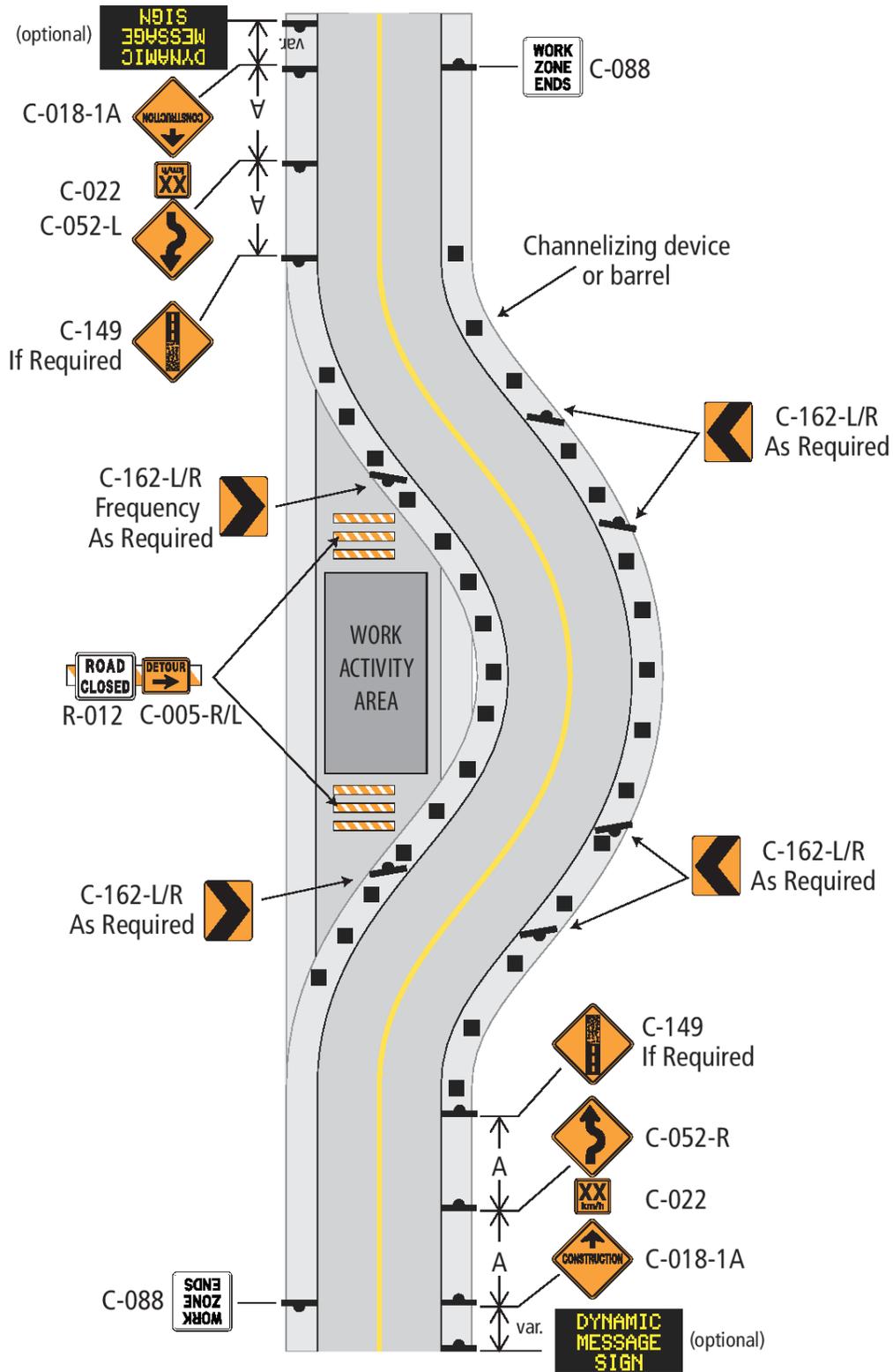
Guidance:

- A No Passing Zone should be created through the diversion by posting No Passing R-022-1 signs at the beginning of the diversion and periodically along the diversion route if required.
- If the tangent distance along the temporary diversion is more than 200 metres, chevrons should be applied separately for each curve.
- An Advisory Speed C-022 tab should be posted as recommended by a Traffic Engineer.

Options:

- Supplemental delineation devices such as additional chevrons, delineators, or raised pavement markers (RPMs) may be required.
- If the diversion is not paved, a centreline may be established by placing cones or tubular markers where a centreline would be.

Figure 7.14: Roadside Diversion – Long Duration



7.15 One-Lane Bridge or Roadway – Short and Long Duration

Purpose:

This layout shows the typical sign setup for traffic self-regulation as drivers approach a one-lane bridge or a one-lane section of roadway. It is typically used on low-volume roadways.

Standard:

- A Yield to Oncoming Traffic R-056-1 sign is used on the side of the bridge or the lane with the longest sight distance.
- A Narrow Structure Ahead C-135 sign shall be used for a one-lane bridge.
- A Road Narrows Ahead C-134 sign shall be used for a one-lane (narrow) road.
- On a roadway reduced to one lane, drums are required for the leading taper.
 - Flashing lights are required on taper devices for setups left in place overnight.
 - Where the speed limit is ≥ 70 km/h, a buffer space shall be used.
- Barricades are required at each end of the work activity area for long-duration work.

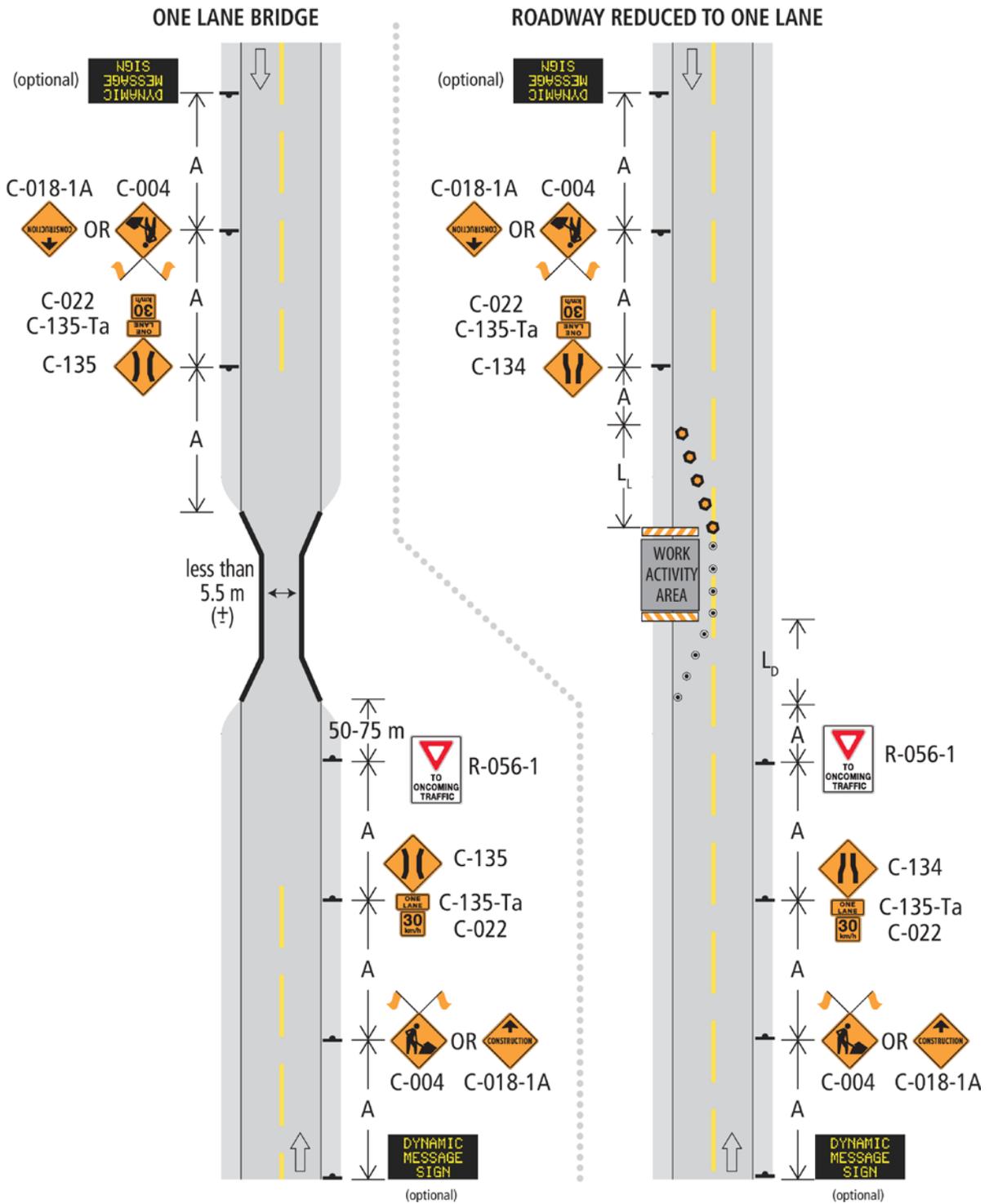
Guidance:

- Advisory speed tabs are typically posted at 30 km/h.
- Grade and curvature of the roadway should be considered to determine the appropriate direction of the R-056-1 sign.
- Where traffic volumes are higher or sight distance is limited causing difficulty navigating the work zone, other traffic control measures should be considered, such as portable traffic signals or TCPs.

Options:

- Additional advance warning may include a dynamic message sign (DMS), a Reduce Speed C-032 sign, or a Traffic Pattern Change C-063 sign.

Figure 7.15: One-Lane Bridge or Roadway – Short and Long Duration



7.16 Pilot Cars

Purpose:

A pilot car (pilot vehicle) is used to lead drivers through a work zone where traffic is single lane alternating where traffic volumes and conditions allow.

The work activity area is typically more than one kilometre long, or the complexity of the work activity area makes it difficult for drivers to navigate on their own (e.g., where there is a substantial change in alignment).

Using a pilot car may reduce the risk of incidents, help to prevent traffic from straying onto the work site, and help to manage driver compliance with construction speed limits.

See also [Section 4.11.9: Pilot Cars for Work Zones](#).

Standard:

- The Follow Pilot Car C-049 sign shall be used at each departure point.
- Pilot cars shall have 360-degree flash light and 4-way flashers. The double-sided Pilot Car C-048-1-DS sign or the Pilot Car C-048-2 overhead sign is required on each pilot car.
- TCPs shall regulate traffic at each end of the work zone.
- TCPs and pilot car operators shall remain in communication throughout the work zone.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.

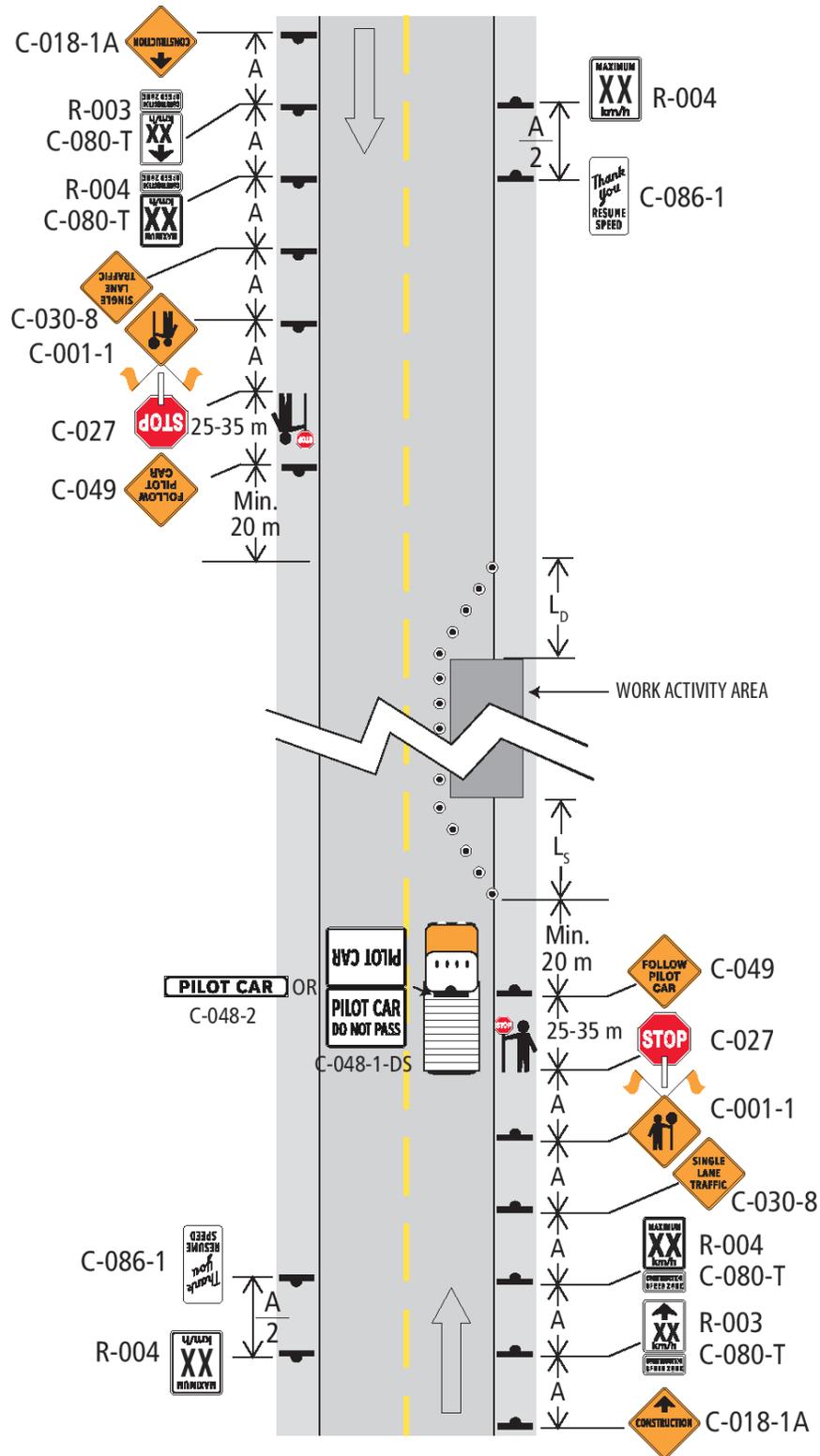
Guidance:

- Additional TCPs and Follow Pilot Car C-049 signs should be used between the TCPs at each end of the work zone for both of these situations:
 - at every intersection that may require additional guidance for motorists entering the roadway
 - at business driveways with sufficiently high traffic volumes, where there is a risk that motorists could enter the roadway against the flow of traffic
- Confirmatory Follow Pilot Car C-049 signs and intermittent centreline delineation should be used for long work zones to remind drivers of the pilot car operation.
- The travel speed should minimize gaps between the vehicles in the platoon to help prevent tar splatter, losing cars, or creating dust in the work zone.
 - When a pilot car is not operating, its 360-degree rotating lights and 4-way flashers should be turned off.
- Where cyclists are regularly observed using the shoulder, provisions for transporting cyclists past the work should be considered.

Options:

- To remind drivers that passing is not allowed within the zone, it may be beneficial to post No Passing R-022-1 signs through the site.
- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- A second Pilot Car may be used to follow or chase the back of the queue to maintain control and visibility of all vehicles.
- Temporary Traffic Signals may be used, controlled by the Pilot Car driver, to replace the TCP

Figure 7.16: Pilot Cars



7.17 Work Near a Rail System Grade Crossing

Purpose:

This layout shows a typical setup for a single lane closure on a two-lane, two-way highway where due to the proximity to a railway crossing, extra care should be taken to minimize the probability of conditions being created by:

- 1) lane restrictions,
- 2) flagging operations, and/or
- 3) other operations where vehicles may get stopped within the grade crossing.

Avoid stopping any vehicles within 5.0 metres on approaches to and departures from crossings, measured from either the closest or farthest rail.

Standard:

- Before work begins, users of this layout shall coordinate with the railroad company, or light rail transit agency operating the line. Getting approvals near rail could be a lengthy process. Therefore, early coordination with rail/transit organizations is required.
- Rail and transit organizations have specific rules for those working in the vicinity of their tracks. Therefore, their rules, and those of Transport Canada will have to be adhered to.
- TCP's shall determine the potential for upstream devices such as traffic signals leading to queuing of vehicles across active rail tracks. Coordination between TCP's to determine upstream storage capacity will help regulate the numbers of vehicles released per direction to mitigate queues stopping on tracks. The R-285 "KEEP TRACKS CLEAR" may be added.
- If the queuing of vehicles across active rail tracks cannot be avoided due to reasons such as the location of upstream traffic signals, an additional flagger shall be provided at the grade crossing to prevent vehicles from stopping within the grade crossing.
- TCP's shall obey the Railway Signals.
- When used at night, the TCP station shall be illuminated with overhead lighting.

Guidance:

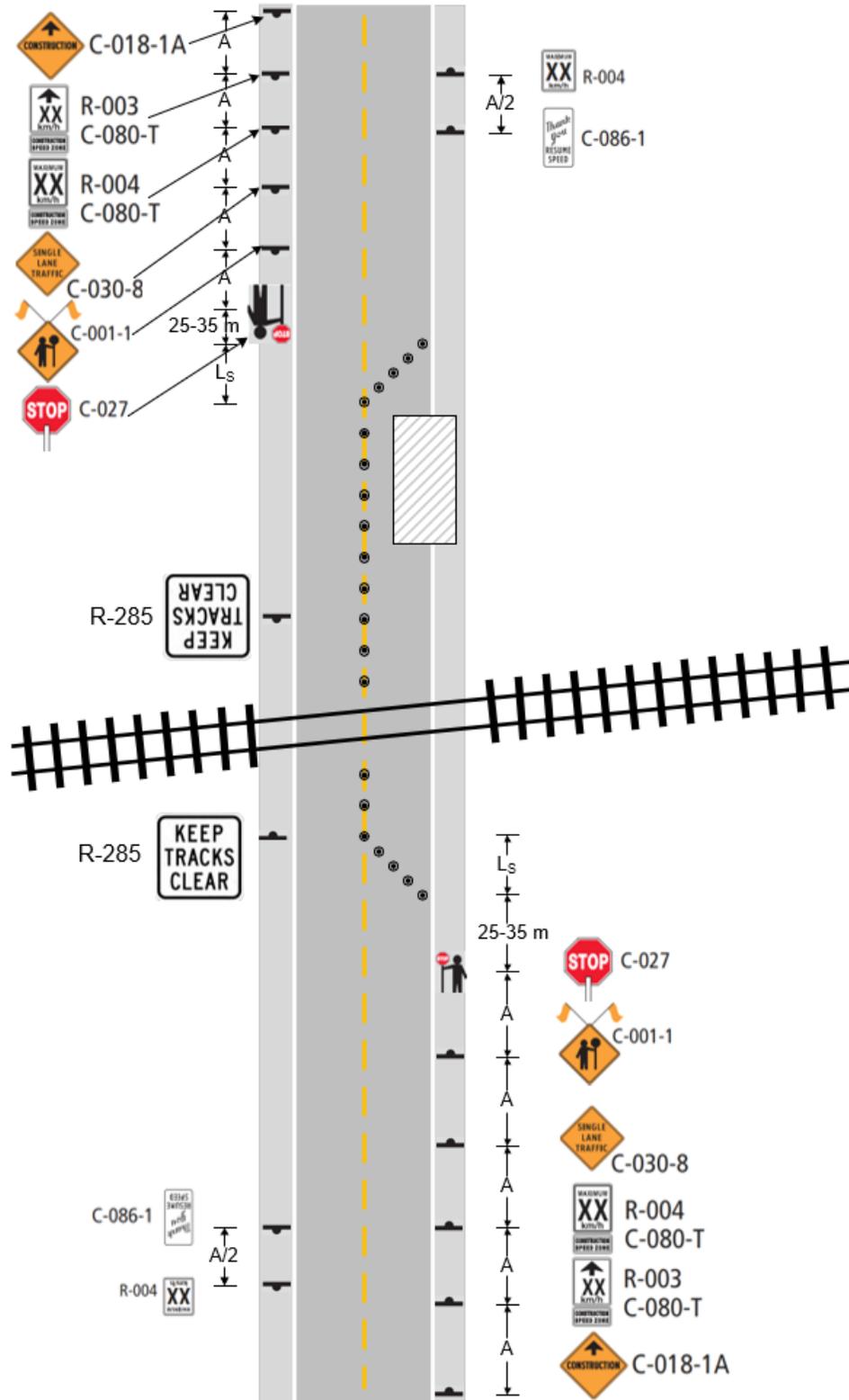
- Extending the buffer space (on the lane closure side) on the upstream side of the grade crossing will help prevent the backup of traffic across the railway crossing created by the TCP operation.
- Channelizing devices shall not be placed within 2.5 metres on either side of the closest and farthest rail.
- The distance between the TCP and the Traffic Control Person Ahead C-001-1 sign should not exceed 150 metres.
- Where Crew Working – Maximum Speed C-002-2 signs establish a Temporary Speed Zone, the C-002-2 should be placed upstream of the C-004 or C-018-1. - Thank You Resume Speed C-086-1 signs should be placed across from the Crew Working – Maximum Speed C-002-2 signs in the opposing lanes.

Options:

- An additional Traffic Control Person Ahead C-001-1 sign may be added to the far side of the road to provide queued drivers with increased awareness of the TCP position.
- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- A Prepare to Stop C-029 sign may replace the Single Lane Traffic C-030-8 sign for other applications that require traffic to stop (e.g., equipment crossing road).
- Run-in delineation, LR may be omitted during period where queues are low, permitting the full release of the queue in each direction.

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Figure 7.17: Work Near a Rail System Grade Crossing



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PART B – TRAFFIC CONTROL

Section 8: Traffic Control Layouts – Multilane Undivided Roadways

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PART B – TRAFFIC CONTROL

Section 8: Traffic Control Layouts – Multilane Undivided Roadways

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

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8.1 General Information– Multilane Undivided Roadway

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign shall be used.
- For long-duration work, a Construction Ahead C-018-1A sign shall be used.
- Where the speed limit is ≥ 70 km/h, a buffer space shall be used.
- A flashing arrow board (FAB) shall be used when a lane is closed.
- All work, buffer, and shadow vehicles shall be equipped with a 360-degree flashing light and 4-way flashers.

Guidance:

- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.

Options:

- Where cyclists are regularly observed using the shoulder, a Share the Road W-132-1 sign may be used with an appropriate cycling hazard tab (see [Section 18: Traffic Control Layouts – Bicycle Lanes](#) for additional information).
- A portable dynamic message sign (DMS) may be used to provide advance messaging for drivers.
- In low speed (≤ 60 km/h) urban areas (within municipal boundaries), customization of traffic control layouts, including closer device spacing and shorter taper lengths, may be necessary to maintain access and mobility. In these cases, document why adjustments are being made.

8.2 Typical Construction Speed Zone Signing – Multilane Undivided Roadway

Purpose:

Construction speed limits are regulatory speeds established in Construction Speed Zones within long-term construction and maintenance project areas where there are continuous hazards for motorists or where workers are in close proximity to active travel lanes.

Construction Speed Zones should be applied prudently because **overuse reduces effectiveness**. Drivers should be able to perceive the need to reduce speed.

Standard:

- Conflicting speed limit signs within the Construction Speed Zone shall be covered or removed.
- The same Construction Speed Zone signing is required in opposing directions.

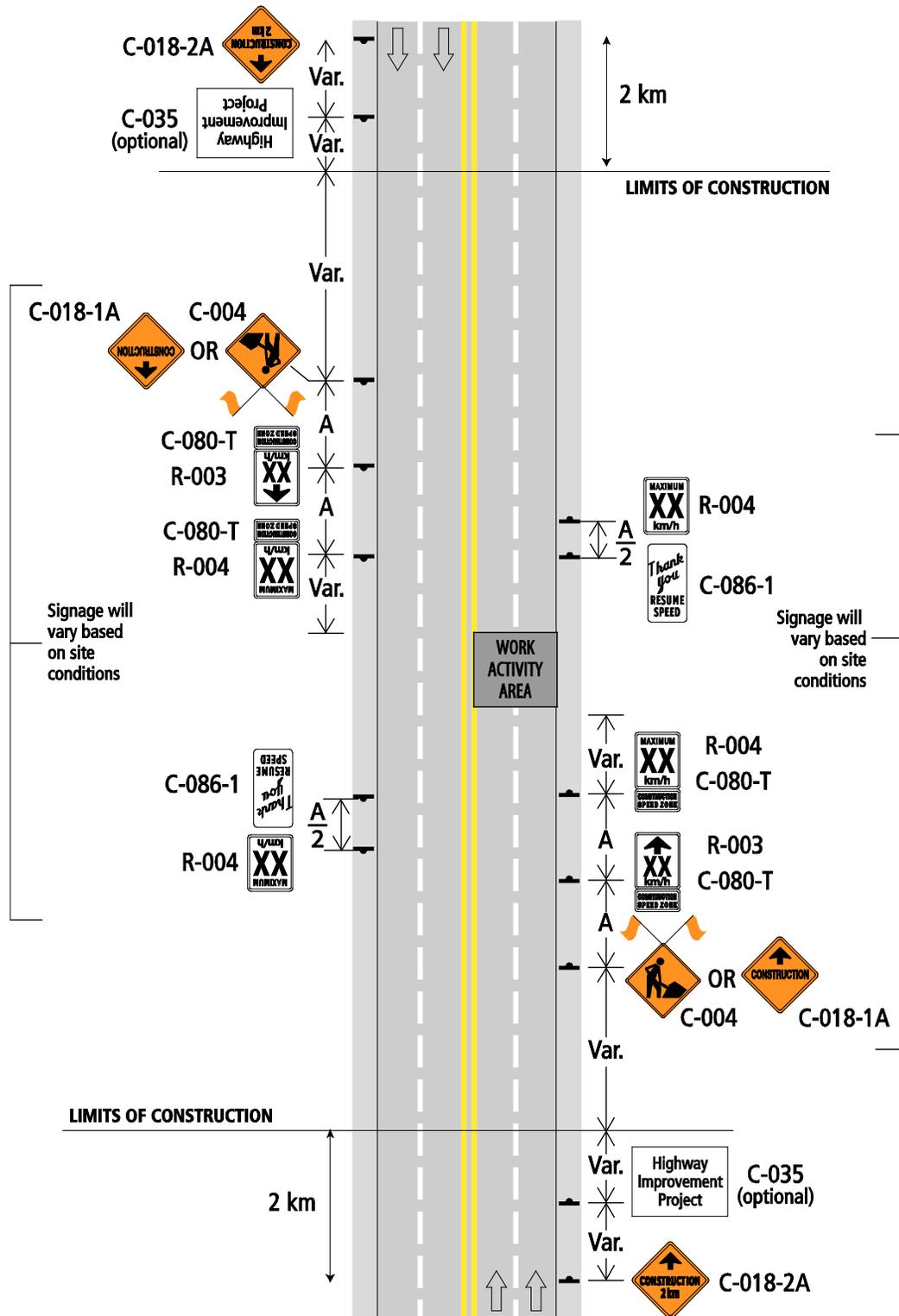
Guidance:

- The Maximum Speed R-004 speed sign with a Construction Speed Zone C-080-T distance tab should be positioned at the beginning of the active work area.
- Construction speed limit signs should be covered or removed when no work is occurring and other hazards are not present.
- It is important to record when construction speed limits are installed and covered/removed.
- See also [Section 2.4: Management of Speed](#) for information on using Construction Speed Zones.

Options:

- Use of the Construction Project C-035 sign is project-dependent. It is typically used only for large projects. See [Appendix B: Standard Construction Signs](#) for information on using this sign.
- If secondary signs are applied, they may be positioned based on:
 - If the median is more than 2 metres wide, secondary signs may be placed in the median.
 - If the median is 2 metres wide or less, secondary signs may be placed on the opposite shoulder.

Figure 8.2: Typical Construction Speed Zone Signing – Multilane Undivided Roadway



8.3 Emergent Work (<5 Minutes) – Multilane Undivided Roadway

Purpose:

Emergent work involves very short-duration activities for which setting up and taking down temporary traffic control devices may take more time than the actual work, and expose workers to greater risk. Each entry onto the travelled portion of the roadway lasts less than 1 minute, and the total time to complete the task is less than 5 minutes.

This does not include emergencies, which are situations which require immediate response to save lives or prevent serious injury using whatever resources are available.

It may occur when an unanticipated situation or event—one that presents a risk to the travelling public—is discovered during travel or work activities. It can be considered unplanned, urgent maintenance work. A Traffic Control Plan is not required for emergent work.

Emergent work may include the removal of debris from the roadway (e.g., tree limbs, lost cargo, dead animals, tire and other vehicle debris, and the manual removal of rock). Isolated pothole patching—patching 1 or 2 potholes in a 1-kilometre section of road—may be considered emergent or brief-duration work. However, it is mobile work when the work crew has to stop several times in succession within a 1-kilometre section to patch multiple potholes.

Standard:

- A risk evaluation is required to determine whether or not the work activity is considered emergent (see [Table C – Risk Evaluation for Emergent or Brief-Duration Work](#) in [Section 6.10](#) or [Appendix F](#)).
- The entire work activity shall be completed in less than 5 minutes.
- The work vehicle shall use a flashing arrow board (FAB) in caution mode or a 360-degree flashing light and 4-way flashers.

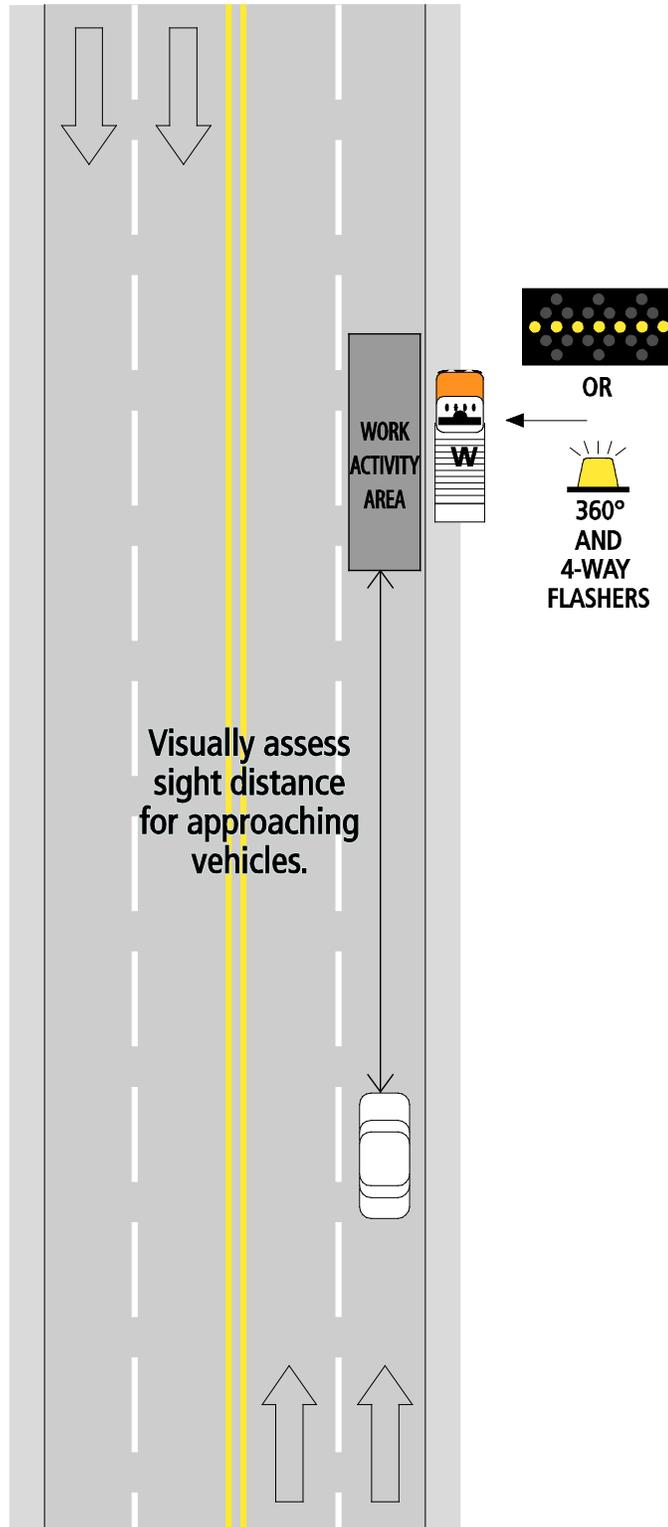
Guidance:

- If a dynamic message sign (DMS) or flashing arrow board (FAB) is used for an operation on the shoulder, it should be set to caution mode.
- The position of the work vehicle in relation to the work area may be adjusted based on the available sight distance, shoulder/off-roadway conditions, and work being performed.

Options:

- None at this time.

Figure 8.3: Emergent Work – Multilane Undivided Roadway



8.4 Brief-Duration Work (<15 Minutes) – Multilane Undivided Roadway

Purpose:

Brief-duration work is generally planned, although the exact location or extent of the work required may not be fully known. It requires less than 15 minutes to complete.

Brief-duration work may include:

- locating drainage structures or other roadway features or components
- cleanup of material spills and removing debris from the roadway (e.g., small fallen trees, larger tree limbs, crash debris, etc.)
- quick repairs intended as a partial or temporary response to damage or failure

If the work is expected to last more than 15 minutes, additional resources will be needed to implement a short-duration work zone. The work should be delayed until the appropriate work zone equipment and devices are available.

Isolated pothole patching—patching 1 or 2 potholes in a 1-kilometre section of road—may be considered emergent or brief-duration work. However, it is mobile work when the work crew has to stop several times in succession within a 1-kilometre section to patch multiple potholes.

Standard:

- A Crew Working Ahead C-004 is required in advance of the work.
- A risk evaluation is required to determine whether or not the work activity is considered brief (see [Table C – Risk Evaluation for Emergent or Brief-Duration Work](#) in [Section 6.10](#) or [Appendix F](#)).
- The work activity shall be completed in less than 15 minutes.
- The work vehicle shall use a flashing arrow board (FAB) in caution mode or a 360-degree flashing light and 4-way flashers.

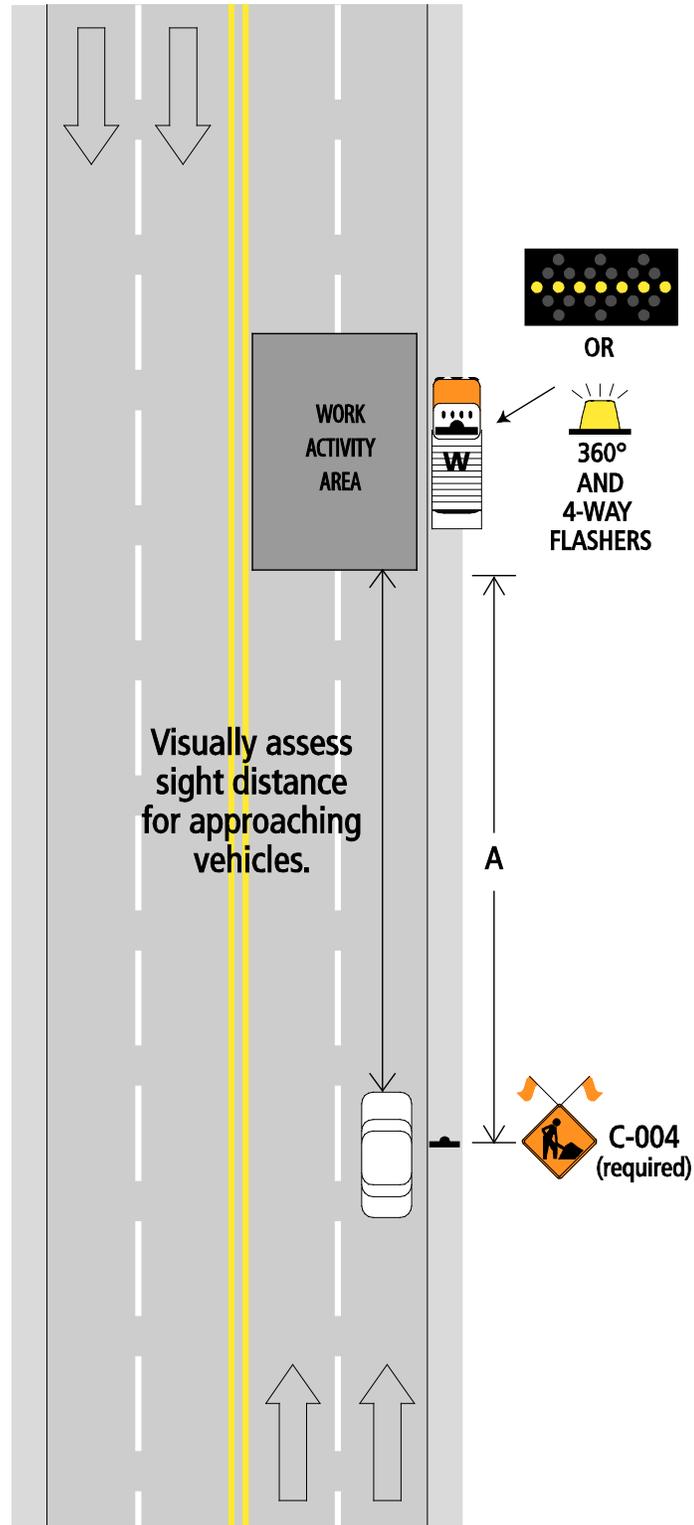
Guidance:

- If a dynamic message sign (DMS) or flashing arrow board (FAB) is used for an operation on the shoulder, it should be set to caution mode.
- The position of the work vehicle in relation to the work area may be adjusted based on the available sight distance, shoulder/off-roadway conditions, and the work being performed.

Options:

- None at this time.

Figure 8.4: Brief-Duration Work – Multilane Undivided Roadway



8.5 Work on Shoulder – Short and Long Duration

Purpose:

Stationary work on the shoulder takes place outside the travel lanes but occupies part or all of the shoulder area.

If shoulder work encroaches into a travel lane, a full lane closure shall be implemented.

Standard:

- When work is in progress and workers are present, a flashing arrow board (FAB) in caution mode is required in the taper or immediately in advance of the work area.
- A barricade is required on the approach side of the work activity area for long-duration work.

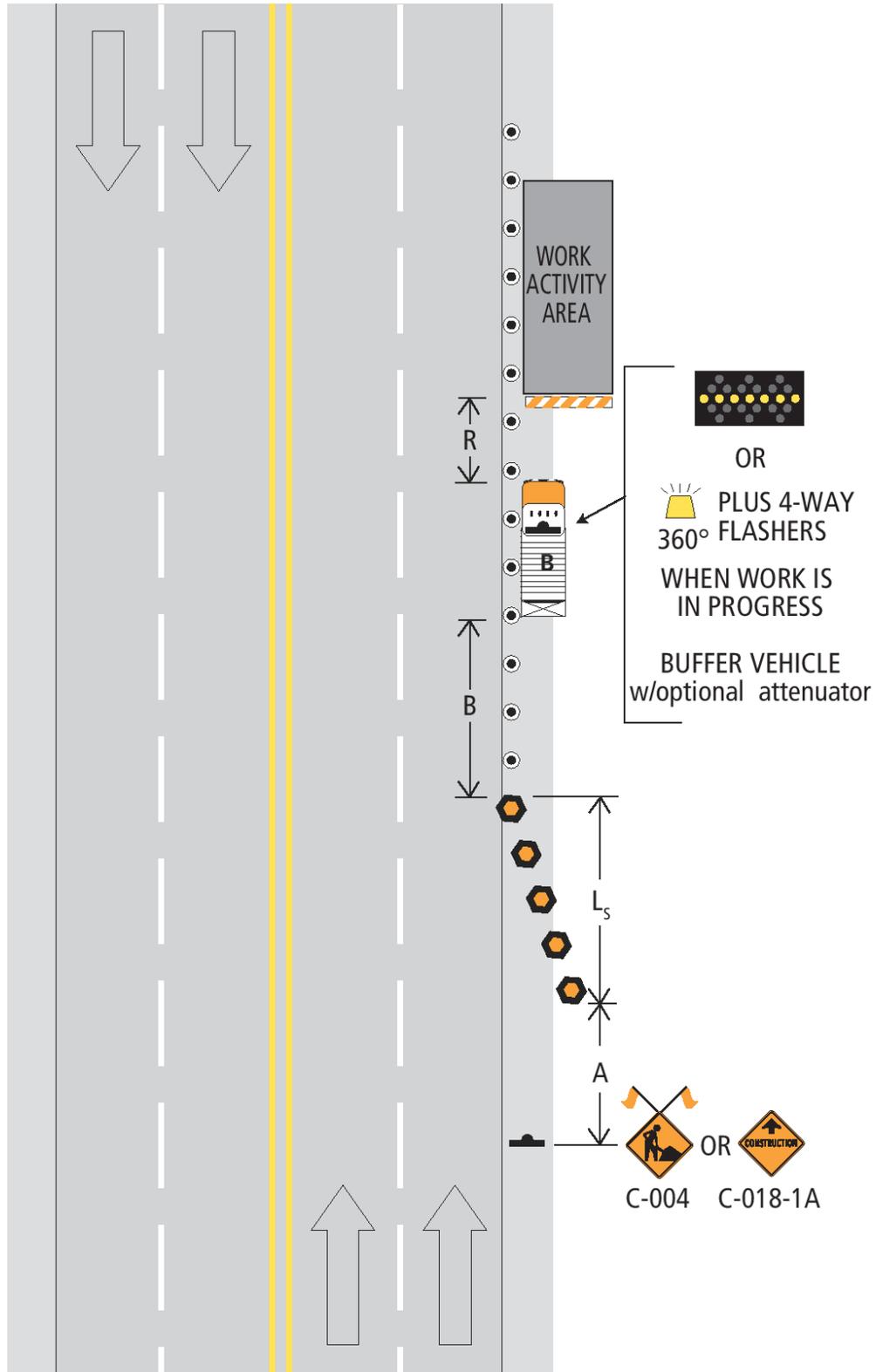
Guidance:

- When work is not in progress but the work area has not been cleared, care should be taken to isolate it from the travelled roadway

Options:

- Advance warning signs may be applied in the opposing direction of travel.
- If the speed limit is ≤ 60 km/h, or there is insufficient room, tubular markers may replace drums for the taper.
- The channelizing devices used alongside the work area may be tubular markers or cones.
- Advance warning signs may be omitted for short-duration work if the shadow vehicle displays a vehicle-mounted dynamic message sign (DMS) or flashing arrow board (FAB) in caution mode and uses a 360-degree flashing light and 4-way flashers.

Figure 8.5: Work on Shoulder – Short and Long Duration



8.6 Right Lane Closed – Short and Long Duration

Purpose:

This layout shows the typical setup for closure of the right travel lane on a multilane undivided highway.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign are required.
- A barricade is required on the approach side of the work activity area for long-duration work.

Guidance:

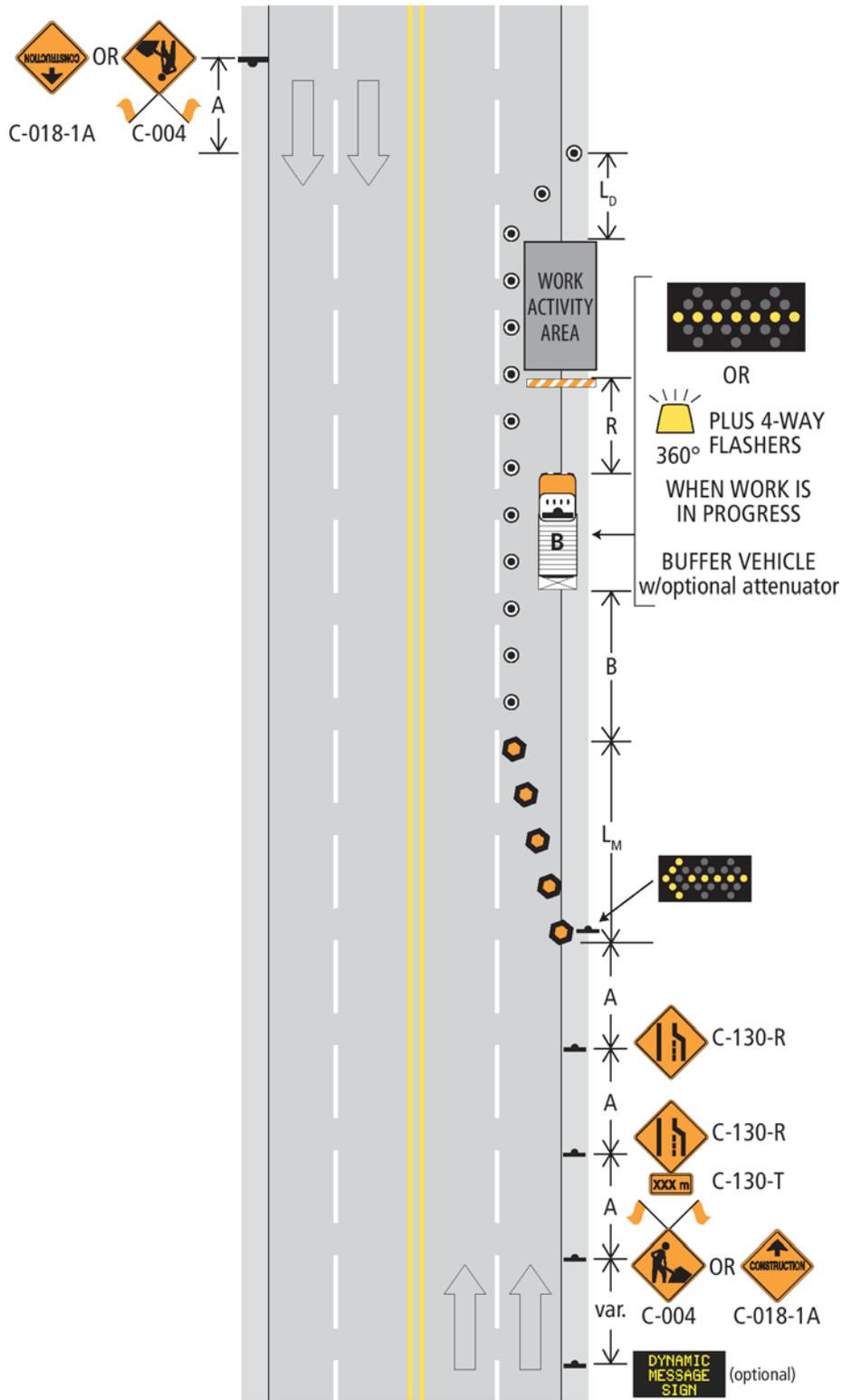
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with *Table A – Taper Lengths*.

Options:

- If the speed limit is ≤ 60 km/h:
 - The upstream Right Lane Closed C-130-R sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B, Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus work vehicle with 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 8.6: Right Lane Closed – Short and Long Duration



8.7 Left Lane Closed – Short and Long Duration

Purpose:

This layout shows the typical setup for closure of the left travel lane on a multilane undivided highway.

Standard:

- A Left Lane Closed Ahead C-130-L sign with a C-130-T distance tab and a second Left Lane Closed Ahead C-130-L sign are required.
- A flashing arrow board (FAB) shall be used where the posted speed limit is ≥ 70 km/h.
- Barricades are required at each end of the work activity area for long-duration work.

Guidance:

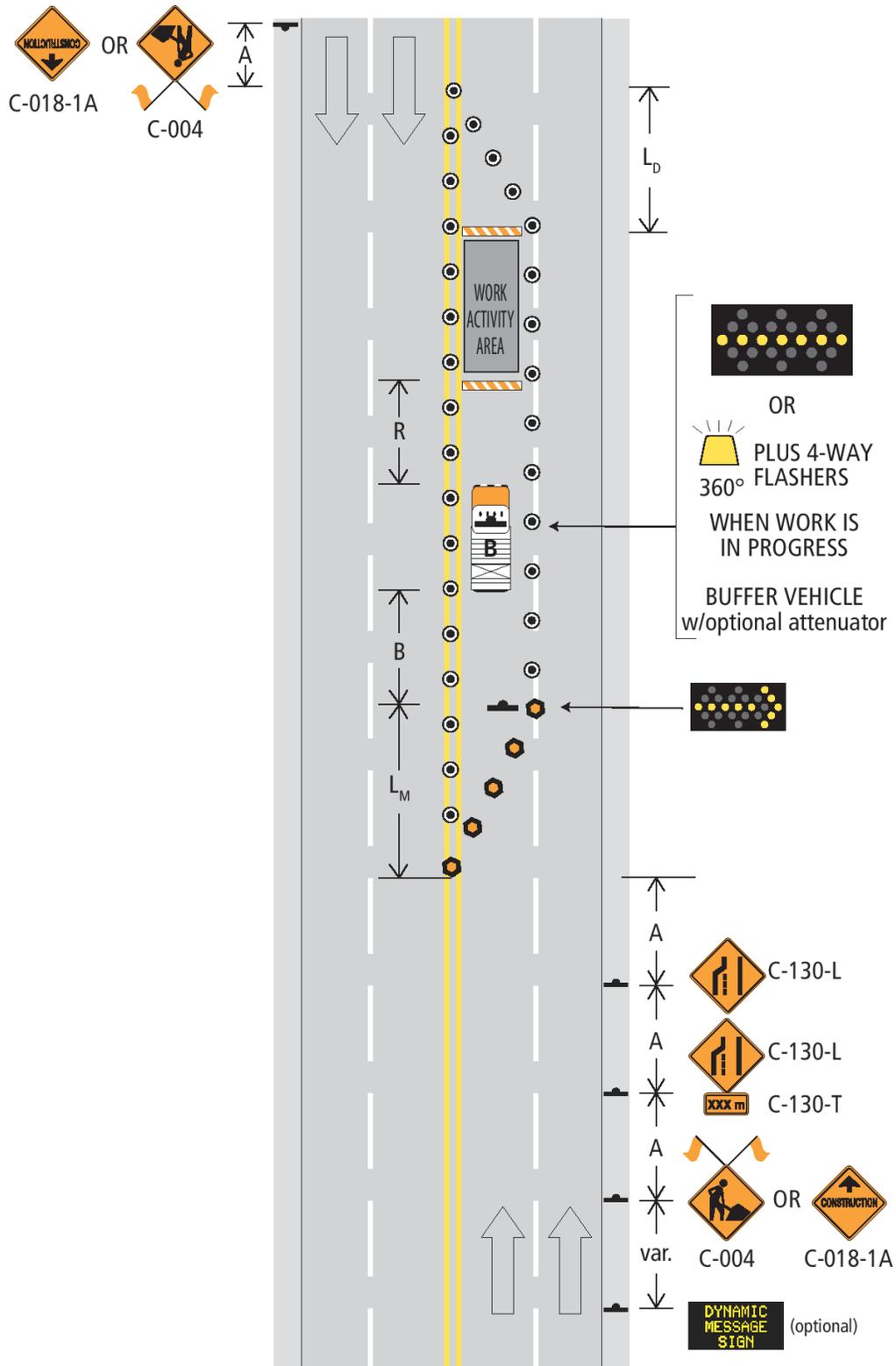
- If adequate space cannot be maintained for worker safety, it may be necessary to close the left lane in the opposing direction.

Options:

- Secondary Left Lane Closed C-130-L signs may be installed on the left side of the highway.
- If the speed limit is ≤ 60 km/h:
 - The upstream Left Lane Closed C-130-L sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B, Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 8.7: Left Lane Closed – Short and Long Duration



8.8 Centre Lane Closure (≤ 60 km/h) – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure of the centre lane on a low-speed multilane roadway.

Standard:

- A Centre Lane Closed Ahead C-030-1A sign with a C-130-T distance tab and a Centre Lane Closed C-030-2 sign are required in advance of the work.
- If there is insufficient room for signs in the centre median, a dynamic message sign (DMS) is required.
- A buffer space shall always be incorporated into the layout.
- A barricade is required on each end of the work activity area for long-duration work.

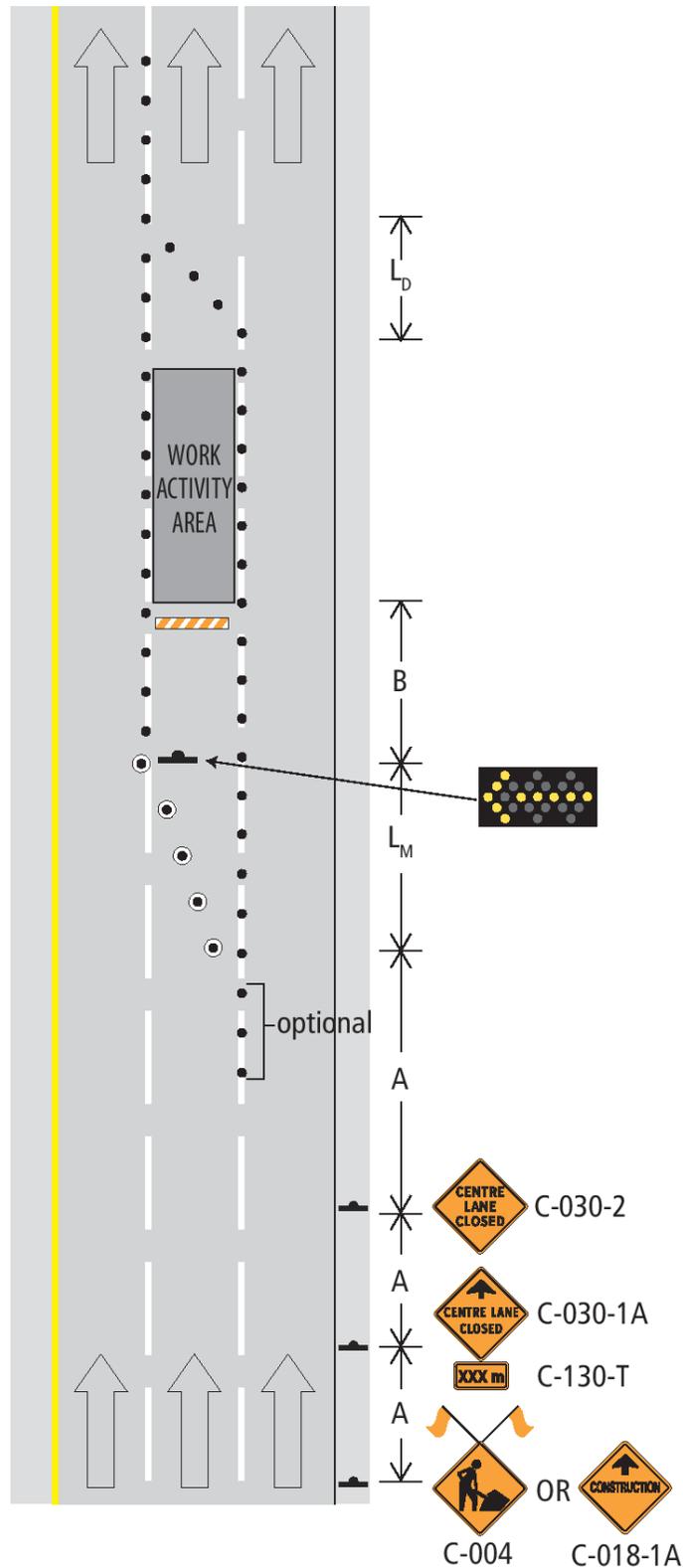
Guidance:

- The spacing of channelizing devices may be reduced to prevent traffic from entering the work area.
- Provided that traffic volumes are sufficiently low, it may be necessary to close two lanes to maintain adequate space for worker safety.
- If space is available, a short, single row of channelizing devices should be added in advance of the traffic split to keep vehicles in their lanes.

Options:

- Interior lane traffic may be directed to either the left or the right lane by using a flashing arrow board (FAB) with the arrow pointing in the direction of the merge taper.

Figure 8.8: Centre Lane Closure (≤ 60 km/h) – Short and Long Duration



8.9 Centre Lane Closure (≥ 70 km/h) – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure of the centre lane on a high-speed multilane roadway.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign shall be placed in advance of the work.
- A Centre Lane Closed C-030-2 sign is required in advance of the lane shift.
- If there is insufficient room for signs in the centre median, a dynamic message sign (DMS) is required.
- Two flashing arrow boards (FABs) shall be used, one in each taper, as shown in the diagram.
- A barricade is required on the approach side of the work activity area for long-duration work.

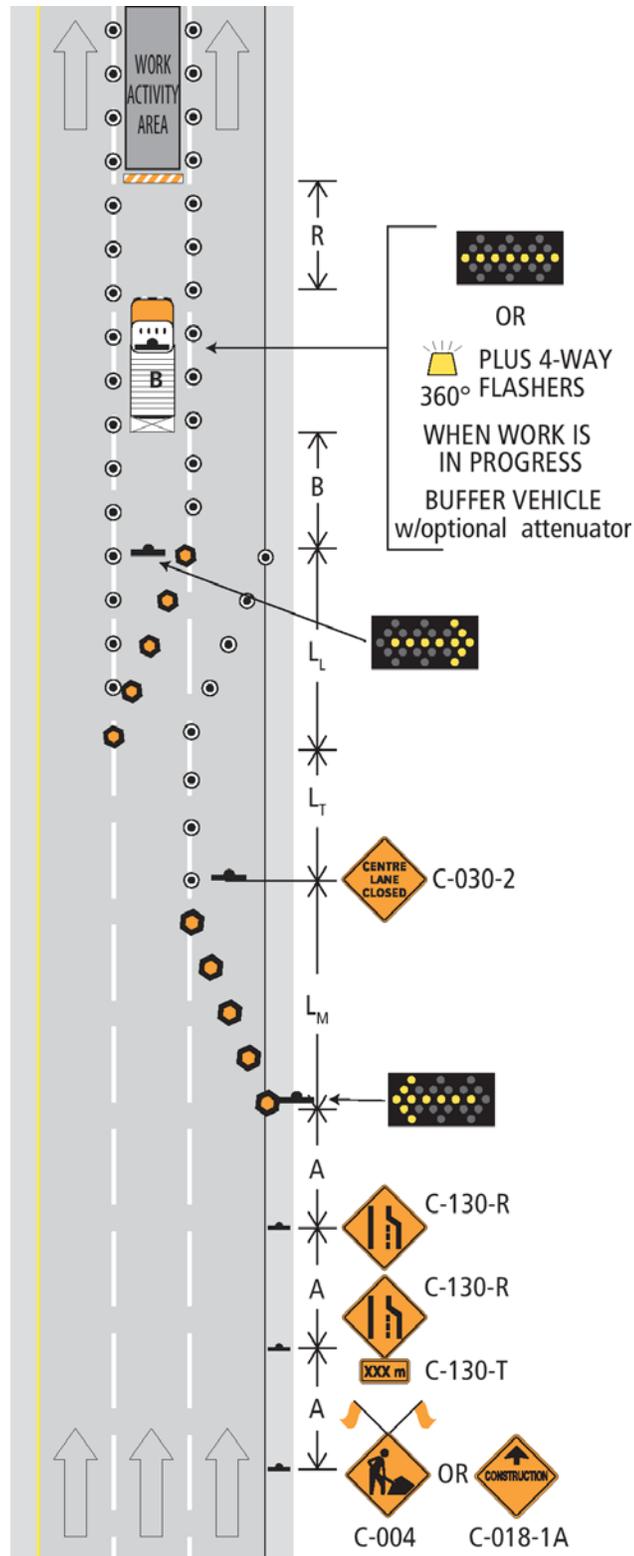
Guidance:

- If the alignment is such that the two flashing arrow boards (FABs) create confusion, the minimum tangent length (LT distance) between the end of the merging taper and beginning of the shift taper should be extended so that road users can focus on one flashing arrow board (FAB) at a time.
- The spacing of channelizing devices may be reduced to prevent traffic from entering the work area.
- Provided that traffic volumes are sufficiently low, it may be necessary to close two lanes to maintain adequate space for worker safety.
- A double lane closure (leaving only one lane open) may be implemented if traffic volumes are sufficiently low. A flashing arrow board (FAB) will be required for each closed lane.
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with [Table A – Taper Lengths](#).

Options:

- Interior lane traffic may be directed to either the left or the right lane by using a flashing arrow board (FAB) with the arrow pointing in the direction of the merge taper.

Figure 8.9: Centre Lane Closure (≥ 70 km/h) – Short and Long Duration



8.10 Centreline Crossover – Short and Long Duration

Purpose:

This layout shows the typical setup for the closure of all lanes in an entire direction of travel on a multilane roadway. Traffic from the closed lanes is re-routed across the centreline into the opposing travel lane, thereby reducing the number of lanes available for opposing traffic.

Using this layout reduces road capacity in both directions of travel so it is important to consider the best time of day for implementing this type of closure.

Standard:

- A Lane Closed Ahead C-130-L/R sign will be required for the left/right lane closure in advance of the work.
- Traffic shall be merged before it is shifted across the centreline.
- Two-Way Traffic Ahead C-132 signs shall be used in advance of sections where two-way traffic has been established.
- Two-Way Traffic R-010 signs shall be used where two-way traffic has been established.
- Channelizing devices or temporary traffic barriers shall be used to separate opposing lanes of traffic.
- A barricade is required in the last affected lane on the approach side of the work activity area for long-duration work.

Guidance:

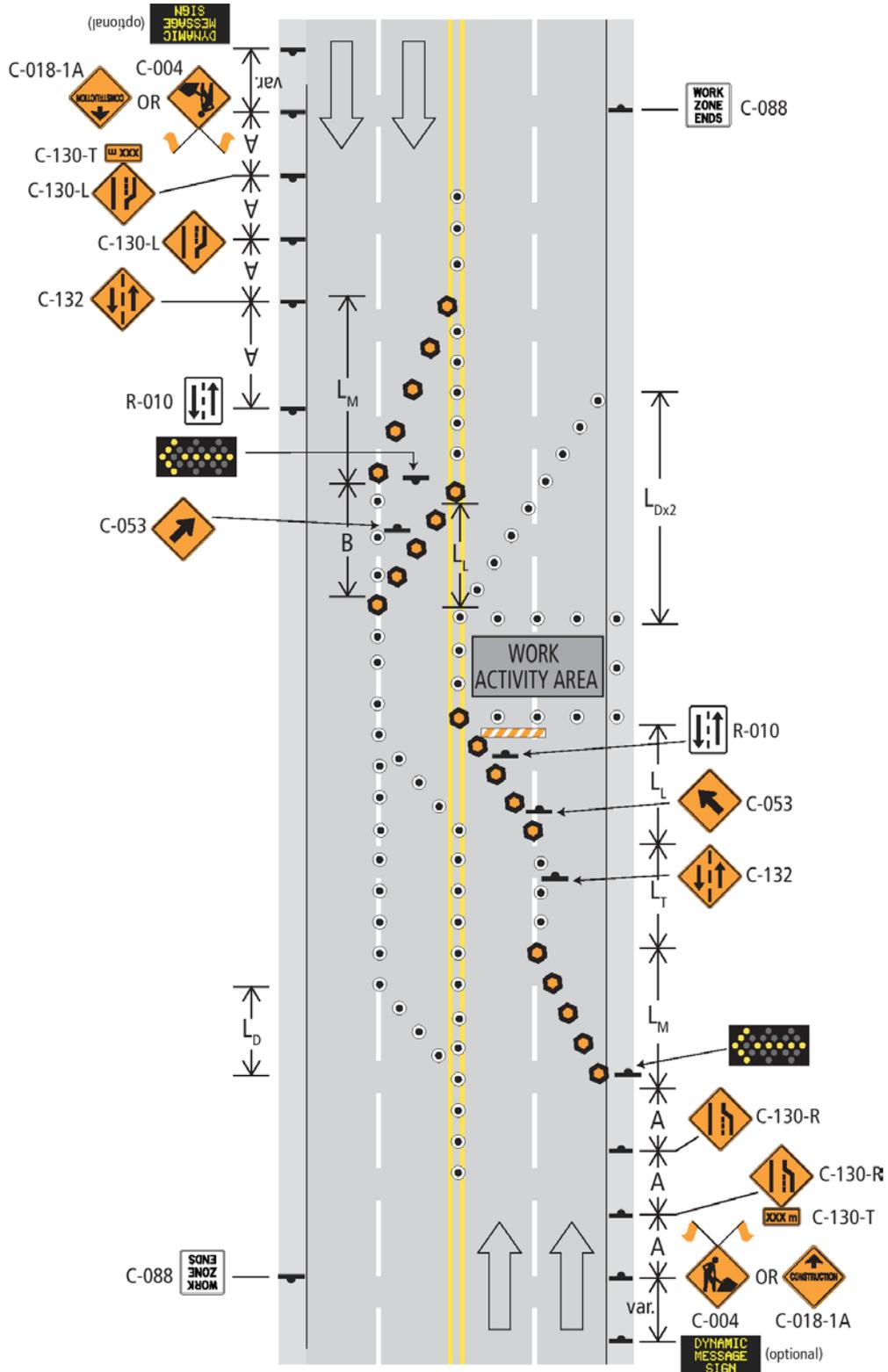
- A dynamic message sign (DMS) is recommended for night work over multiple night-time shifts.
- When re-establishing normal traffic flow, remove the signs and devices for the diverted lanes first, and then remove the devices for the opposing lanes.

Options:

- If the speed limit is ≤ 60 km/h, the upstream Right Lane Closed Ahead C-130-R sign with distance tab may be omitted, and the Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
- A custom Traffic Pattern Changed Zx-030 sign with an implementation plan on counterflow operations and transitions may be used as a supplement. See Zx-030 [Appendix B](#).
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 8.10: Centreline Crossover – Short and Long Duration



8.11 Two-Way Left-Turn Lane Closed – Short and Long Duration

Purpose:

This layout shows the typical setup for the closure of a two-way left-turn lane. If the work will encroach into either travel lane, a left lane closure for the affected lane(s) should be considered.

Standard:

- A flashing arrow board (FAB) in caution mode is required for each direction of travel.
- Barricades are required at each end of the work activity area for long-duration work.

Guidance:

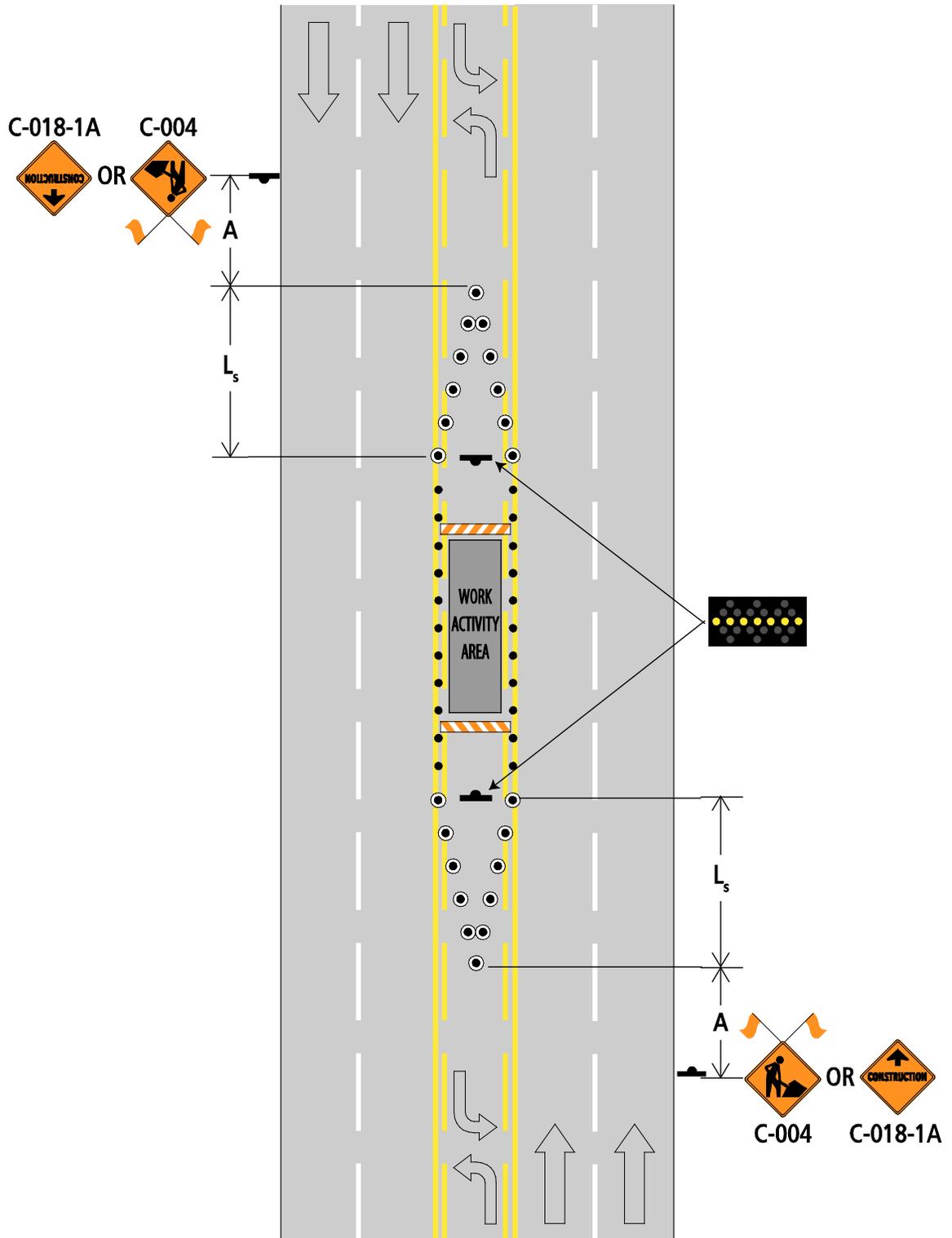
- Left-turning movements may be prohibited along the work activity area and taper.

Options:

- Depending on the nature of the work and whether or not it will encroach into either travel lane, one or both adjacent lanes may also have to be closed.
- For speeds ≤ 60 km/h, cones may be used instead of the tubular markers to channelize traffic.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 8.11: Two-Way Left-Turn Lane Closed – Short and Long Duration



8.12 Runaway Lane Open – Short and Long Duration

Purpose:

Runaway lanes are emergency escape ramps created for long, descending grades. On such grades, vehicle speeds may increase and brakes may overheat and fail because of the extensive braking used to slow the vehicle. The runaway lanes allow vehicles with brake problems to exit the roadway and stop. Runaway lanes should be kept open whenever possible because of their importance for roadway safety.

This layout shows the typical setup for work adjacent to a runaway lane that remains open. Effort should be made to **clearly communicate the open status of the runaway lane** to truck drivers and other approaching motorists.

Standard:

- Construction equipment shall never be left parked in—or blocking access to—an open runaway lane.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign shall be placed in advance of the exit ramp.
- A flashing arrow board (FAB) shall be placed inside the taper.
- A buffer space shall always be used.
- A barricade is required on the approach side of the work activity area for long-duration work.
- A dynamic message sign (DMS) shall be used to communicate the runaway lane status.

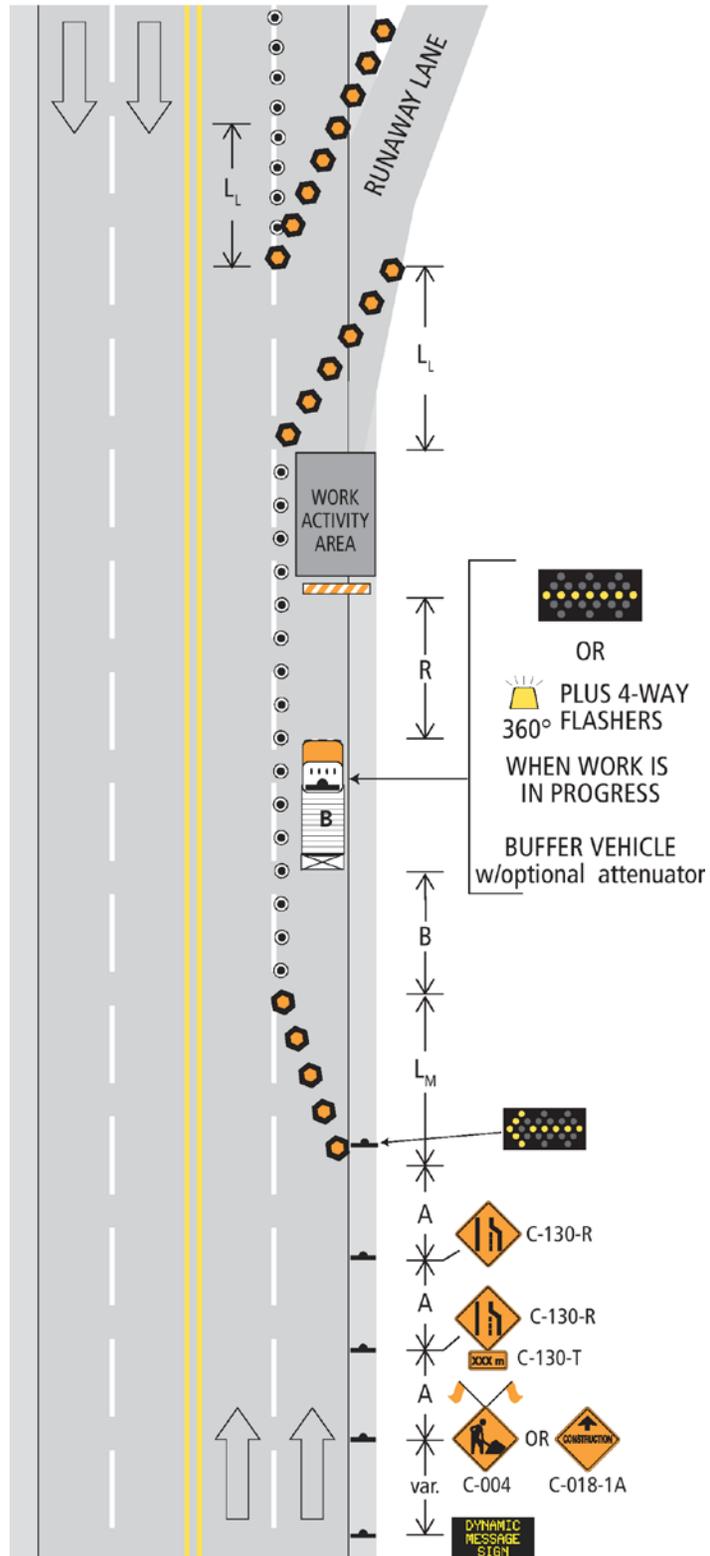
Guidance:

- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.
- Vehicles should not be queued in advance of—or through—the entrance to a runaway lane.

Options:

- None at this time.

Figure 8.12: Runaway Lane Open – Short and Long Duration



8.13 Runaway Lane Closed – Short and Long Duration

Purpose:

Runaway lanes are emergency escape ramps created for long, descending grades. On such grades, vehicle speeds may increase and brakes may overheat and fail because of the extensive braking used to slow the vehicle. The runaway lanes allow vehicles with brake problems to exit the roadway and stop. Runaway lanes should be kept open whenever possible because of their importance for roadway safety.

This layout shows the typical setup for work in front of a runaway lane that is closed. When work is occurring in front of runaway lanes, effort shall be made to clearly communicate the closed status of the runaway lane to truck drivers and other approaching motorists.

Even if a runaway lane is closed, extreme caution should be used when working in front of or across the runaway lane. Never assume that just because it is considered closed, a truck would not attempt to use it in an emergency.

Standard:

- Truck drivers shall be notified of runaway lane closures at (within or in advance of) the brake check and in advance of the grade.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign shall be placed in advance of the entrance ramp.
- The Runaway Lane Closed C-067 sign shall be positioned 200 metres or distance A, whichever is greater, in advance of the affected runaway lane. It shall be removed or covered as soon as possible once the runaway lane is available.
- For construction zones across runaway lanes, use the Closed C-061 tab mounted above or across the existing runaway signs.
- A dynamic message sign (DMS) shall be used to communicate the runaway lane closure. Appropriate positioning and messaging should be discussed with the Road Authority.
- A buffer space shall always be used.
- A barricade is required on the approach side of the work activity area for long-duration work.

Guidance:

- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.
- Vehicles should not be queued in advance of—or through—the entrance to a runaway lane.
- If a lane closure is not required, the Right Lane Closed Ahead C-130 series and flashing arrow board (FAB) can be removed.

Options:

- Notification at the brake check may be communicated through a dynamic message sign (DMS), C-067 Runaway Lane Closed sign, or custom signing.

8.14 Passing/Climbing Lanes – Lane Shift – Short and Long Duration

Purpose:

In mountainous areas, the presence of truck climbing lanes or uphill passing lanes provides an opportunity to avoid single lane alternating traffic control when a lane closure is necessary in the downhill lane.

A lane shift may be used to move downhill traffic into the left-most uphill lane while uphill traffic is restricted to a single lane. Using a lane shift is preferable to stopping downhill traffic, but it may not always be feasible.

Standard:

- Two-Way Traffic Ahead C-132 signs shall be used in advance of sections where two-way traffic has been established.
- Two-Way Traffic R-010 signs shall be used along tangents where two-way traffic has been established.
- A flashing arrow board (FAB) shall be placed inside the tapers.
- Passing/climbing lane signs that are no longer applicable because of the lane shift shall be covered.
- A barricade is required on the approach side of the work activity area for long-duration work.

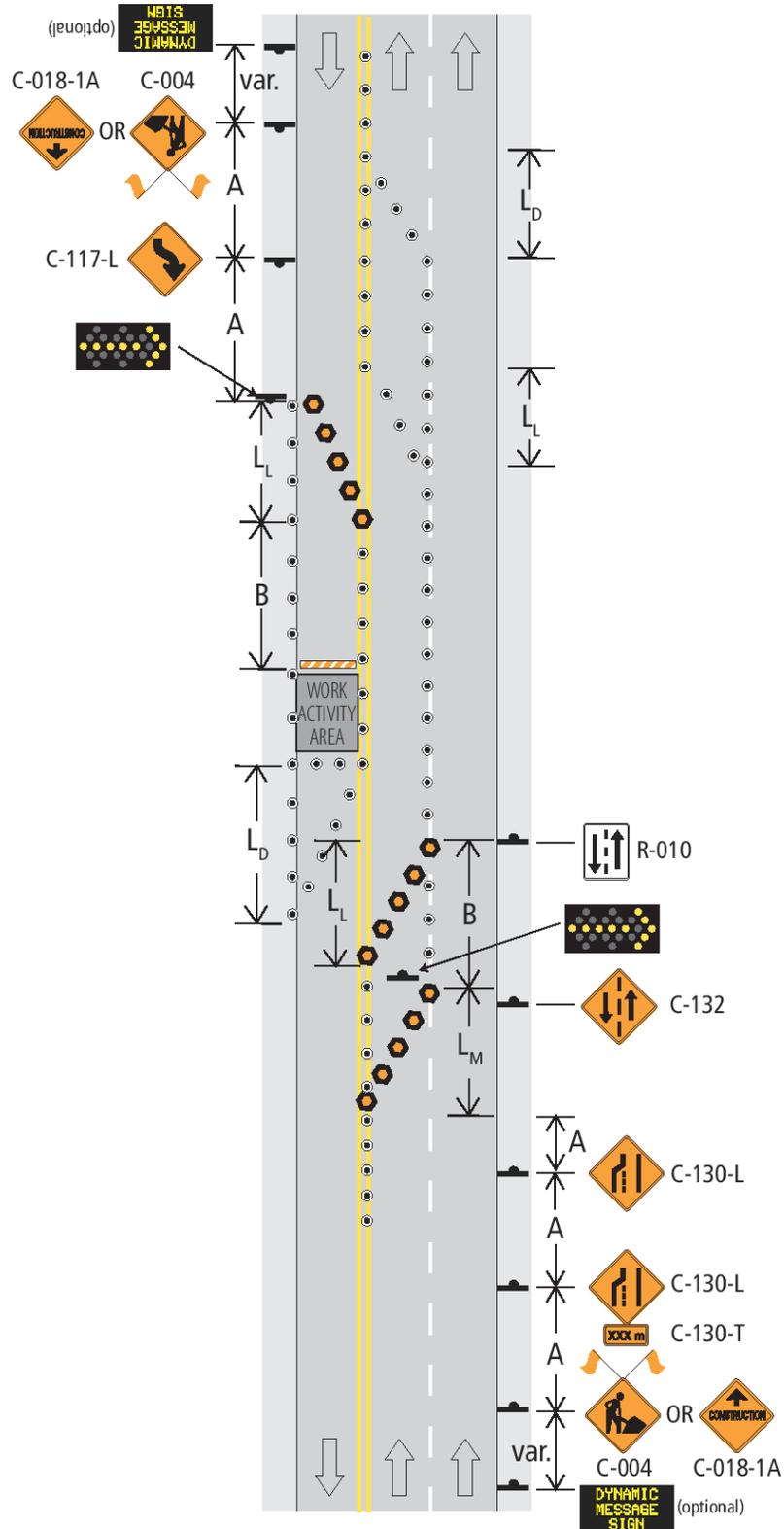
Guidance:

- Passing restrictions in both directions should be discussed with the Road Authority to determine whether or not traffic volumes will allow decreased capacity in the uphill direction.

Options:

- None at this time.

Figure 8.14: Passing/Climbing Lanes – Lane Shift – Short and Long Duration



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PART B – TRAFFIC CONTROL

Section 9: Traffic Control Layouts – Multilane Divided Roadways

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PART B – TRAFFIC CONTROL

Section 9: Traffic Control Layouts – Multilane Divided Roadways

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

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9.1 General Information – Multilane Divided Roadway

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign shall be used.
- For long-duration work, a Construction Ahead C-018-1A sign shall be used.
- Where the speed limit is ≥ 70 km/h, a buffer space shall be used.
- A flashing arrow board (FAB) shall be used when a lane is closed.
- All work, buffer, and shadow vehicles shall be equipped with a 360-degree flashing light and 4-way flashers.
- A barricade is required in the last affected lane on the approach side of the work activity area for long-duration work.

Guidance:

- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.

Options:

- Where cyclists are regularly observed using the shoulder, a Share the Road W-132-1 sign may be used with an appropriate cycling hazard tab (see [Section 18: Traffic Control Layouts – Bicycle Lanes](#) for additional information).
- A portable dynamic message sign (DMS) may be used to provide advance messaging for drivers.

9.2 Typical Construction Speed Zone Signing – Multilane Divided Roadway

Purpose:

Construction speed limits are regulatory speeds established in Construction Speed Zones within long-term construction and maintenance project areas where there are continuous hazards for motorists or where workers are in close proximity to active travel lanes.

Construction Speed Zones should be applied prudently because **overuse reduces effectiveness**. Drivers should be able to perceive the need to reduce speed.

Standard:

- Conflicting speed limit signs within the Construction Speed Zone shall be covered or removed.

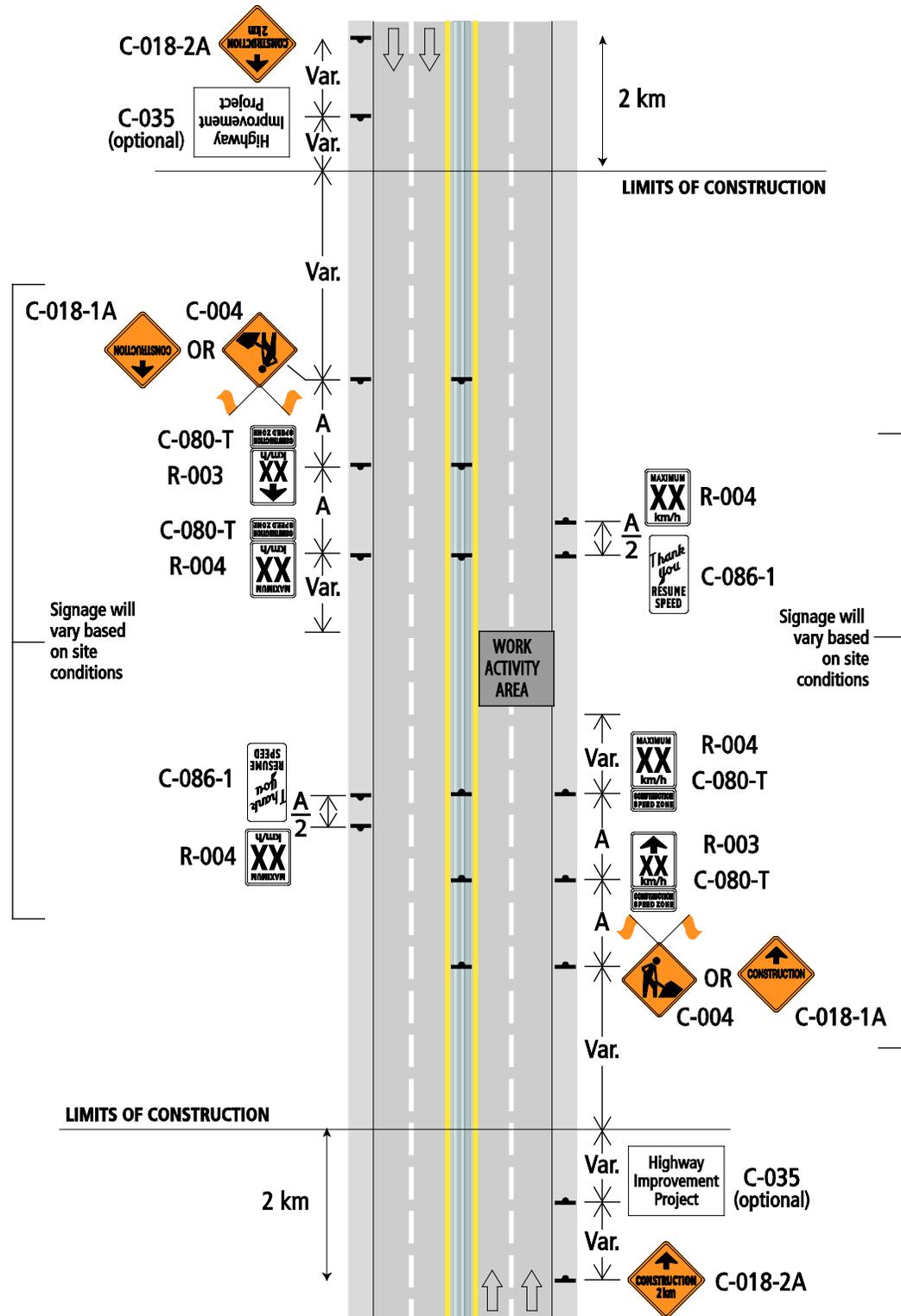
Guidance:

- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- The Maximum Speed R-004 speed sign with a Construction Speed Zone C-080-T distance tab should be positioned at the beginning of the active work area.
- Construction speed limit signs should be covered or removed when no work is occurring and other hazards are not present.
- It is important to record when construction speed limits are installed and covered/removed.
- See also [Section 2.4: Management of Speed](#) for information on using Construction Speed Zones.

Options:

- Use of the Construction Project C-035 sign is project-dependent. It is typically used only for large projects. See [Appendix B: Standard Construction Signs](#) for information on using this sign.
- If secondary signs are applied, they should be installed on the left side of the highway.

Figure 9.2: Typical Construction Speed Zone Signing – Multilane Divided Roadway



9.3 Emergent Work (<5 Minutes) – Multilane Divided Roadway

Purpose:

Emergent work involves very short-duration activities for which setting up and taking down temporary traffic control devices may take more time than the actual work, and expose workers to greater risk. Each entry onto the travelled portion of the roadway lasts less than 1 minute, and the total time to complete the task is less than 5 minutes.

This does not include emergencies, which are situations which require immediate response to save lives or prevent serious injury using whatever resources are available.

It may occur when an unanticipated situation or event—one that presents a risk to the travelling public—is discovered during travel or work activities. It can be considered unplanned, urgent maintenance work. A Traffic Control Plan is not required for emergent work.

Emergent work may include the removal of debris from the roadway (e.g., tree limbs, lost cargo, dead animals, tire and other vehicle debris, and the manual removal of rock). Isolated pothole patching—patching 1 or 2 potholes in a 1-kilometre section of road—may be considered emergent or brief-duration work. However, it is mobile work when the work crew has to stop several times in succession within a 1-kilometre section to patch multiple potholes.

Standard:

- A risk evaluation is required to determine whether or not the work activity is considered emergent (see [Table C – Risk Evaluation for Emergent or Brief-Duration Work](#) in [Section 6.10](#) or [Appendix F](#)).
- The entire work activity shall be completed in less than 5 minutes.
- The work vehicle shall use a flashing arrow board (FAB) in caution mode or a 360-degree flashing light and 4-way flashers.

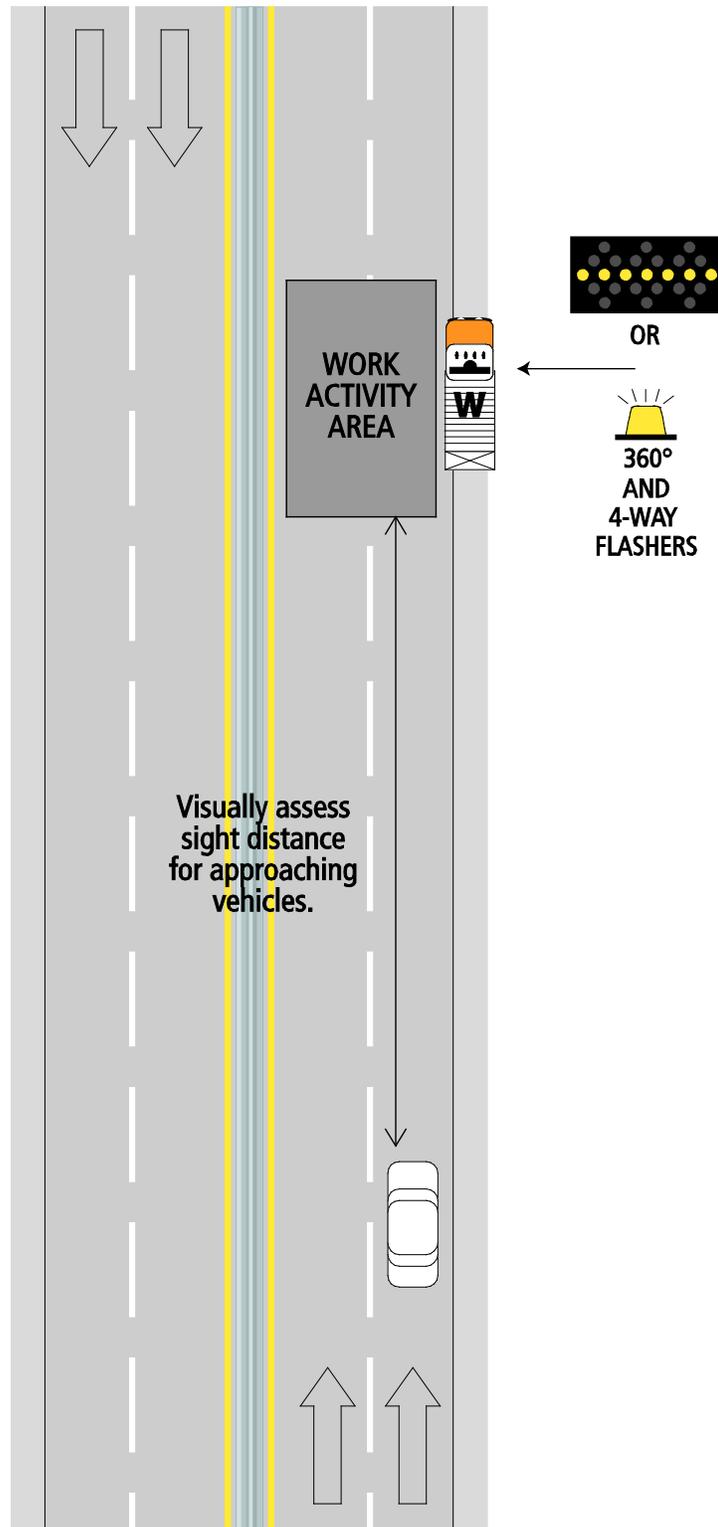
Guidance:

- If a dynamic message sign (DMS) or flashing arrow board (FAB) is used for an operation on the shoulder, it should be set to caution mode.
- Alternatively, a 360-degree flashing light and 4-way flashers should be used.
- The position of the work vehicle in relation to the work area may be adjusted based on the available sight distance, shoulder/off-roadway conditions, and work being performed.

Options:

- None at this time

Figure 9.3: Emergent Work (<5 Minutes) – Multilane Divided Roadway



9.4 Brief-Duration Work (<15 Minutes) – Multilane Divided Roadway

Purpose:

Brief-duration work is generally planned, although the exact location or extent of the work required may not be fully known. It requires less than 15 minutes to complete.

Brief-duration work may include:

- locating drainage structures or other roadway features or components
- cleanup of material spills and removing debris from the roadway (e.g., small fallen trees, larger tree limbs, crash debris, etc.)
- quick repairs intended as a partial or temporary response to damage or failure

If the work is expected to last 15 minutes or longer, additional resources will be needed to implement a short-duration work zone. The work should be delayed until the appropriate work zone equipment and devices are available.

Isolated pothole patching—patching 1 or 2 potholes in a 1-kilometre section of road—may be considered emergent or brief-duration work. However, it is mobile work when the work crew has to stop several times in succession within a 1-kilometre section to patch multiple potholes.

Standard:

- A Crew Working Ahead C-004 is required in advance of the work.
- A risk evaluation is required to determine whether or not the work activity is considered emergent (see [Table C – Risk Evaluation for Emergent or Brief-Duration Work](#) in [Section 6.10](#) or [Appendix F](#)).
- The work activity shall be completed in less than 15 minutes.
- The work vehicle shall use a flashing arrow board (FAB) in caution mode or a 360-degree flashing light and 4-way flashers.

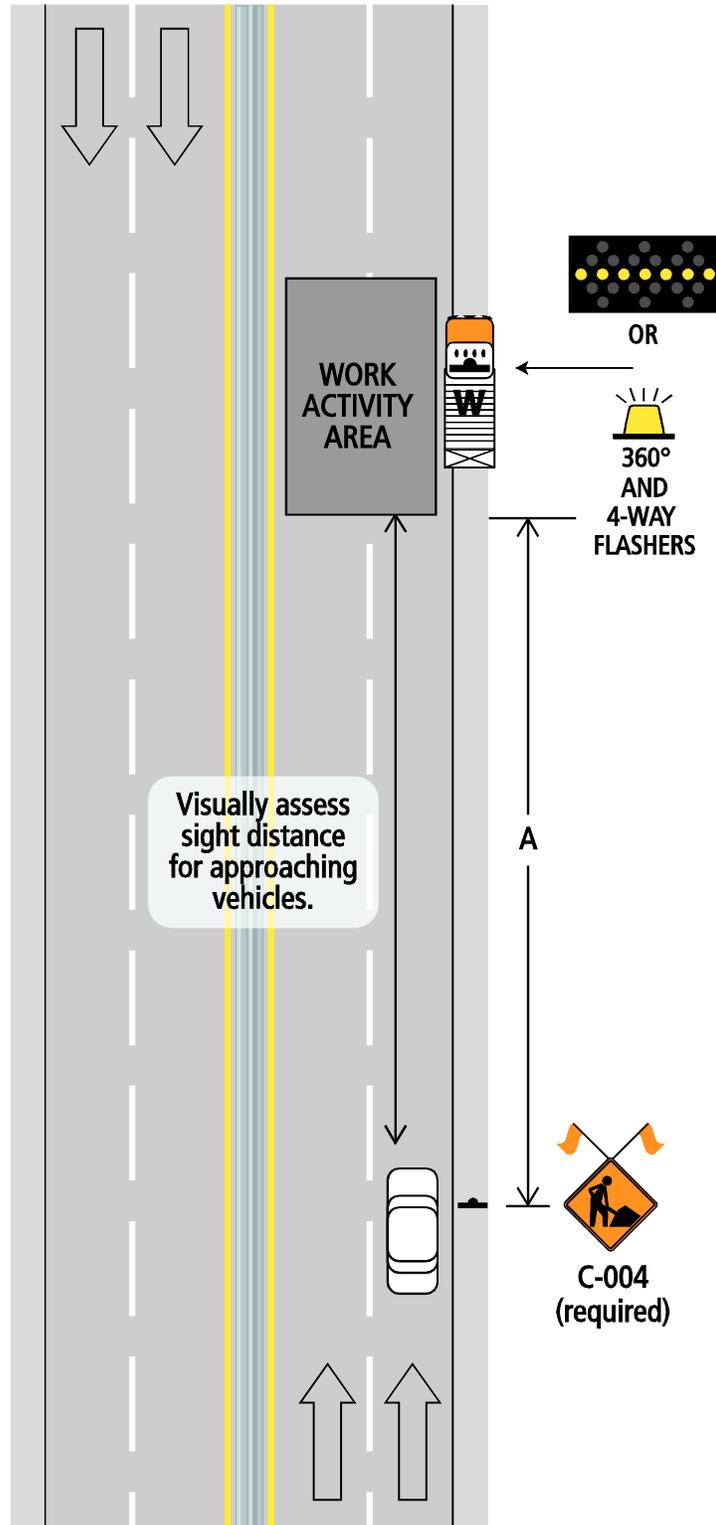
Guidance:

- If a dynamic message sign (DMS) or flashing arrow board (FAB) is used for an operation on the shoulder, it should be set to caution mode.
- The position of the work vehicle in relation to the work area may be adjusted based on the available sight distance, shoulder/off-roadway conditions, and the work being performed.

Options:

- None at this time.

Figure 9.4: Brief-Duration Work (<15 Minutes) – Multilane Divided Roadway



9.5 Work on Shoulder – Short and Long Duration

Purpose:

Stationary work on the shoulder takes place outside the travel lanes but occupies part or all of the shoulder area.

If shoulder work encroaches into a travel lane, a full lane closure shall be implemented.

Standard:

- When work is in progress and workers are present, a flashing arrow board (FAB) in caution mode is required in the taper or immediately in advance of the work area.
- A barricade is required on the approach side of the work activity area for long-duration work.

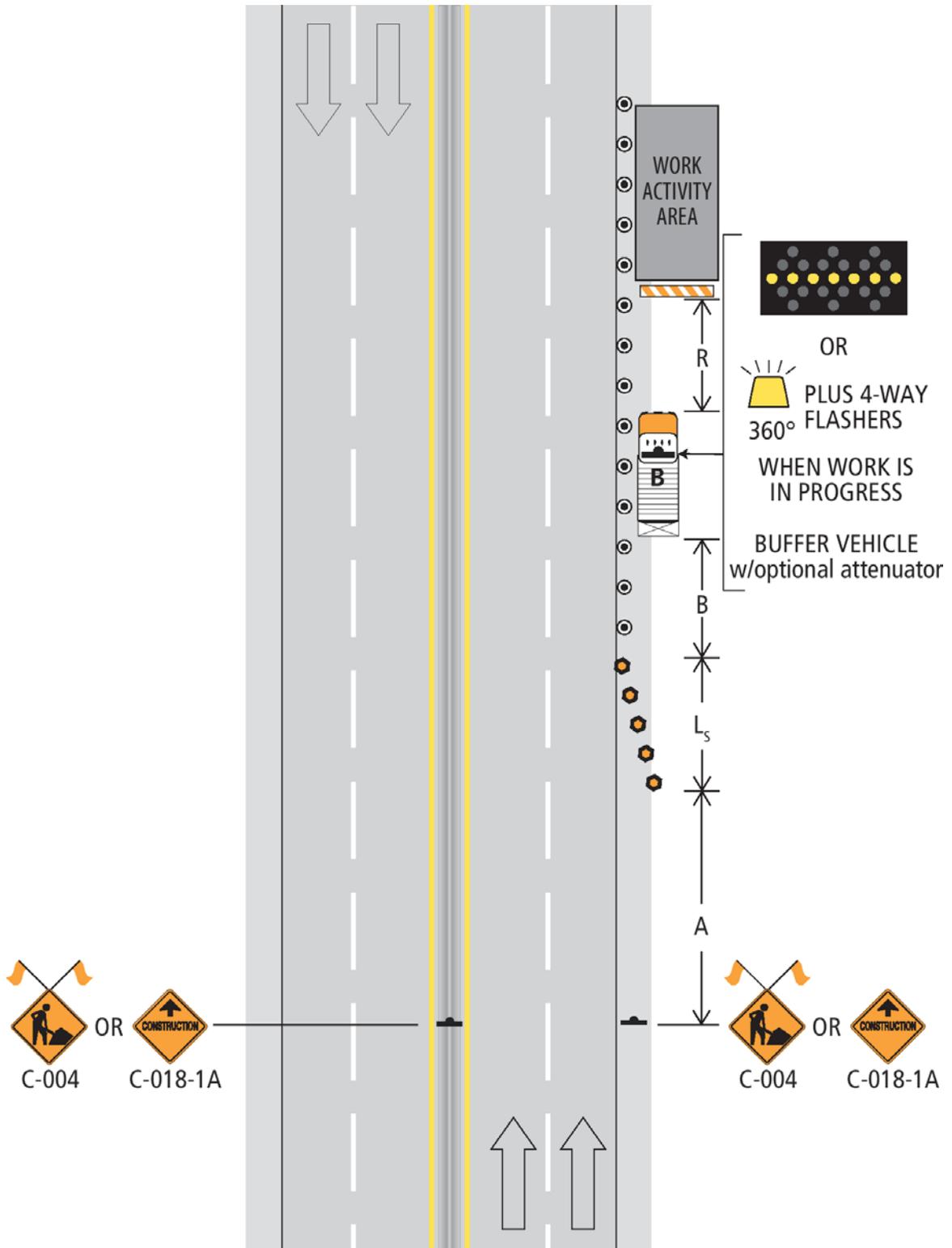
Guidance:

- When work is not in progress but the work area has not been cleared, care should be taken to isolate it from the travelled roadway.

Options:

- Signage may be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Advance warning signs may be applied in the opposing direction of travel.
- If the speed limit is ≤ 60 km/h, or there is insufficient room, tubular markers may replace drums for the taper.
- The channelizing devices used alongside the work area may be tubular markers or cones.
- Advance warning signs may be omitted for short-duration work if the shadow vehicle displays a vehicle-mounted dynamic message sign (DMS) or flashing arrow board (FAB) in caution mode and uses a 360-degree flashing light and 4-way flashers.

Figure 9.5: Work on Shoulder – Short and Long Duration



9.6 Right Lane Closed – Short and Long Duration

Purpose:

This layout shows the typical setup for closure of the right travel lane on a multilane divided highway.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign shall be placed in advance of the work.

Guidance:

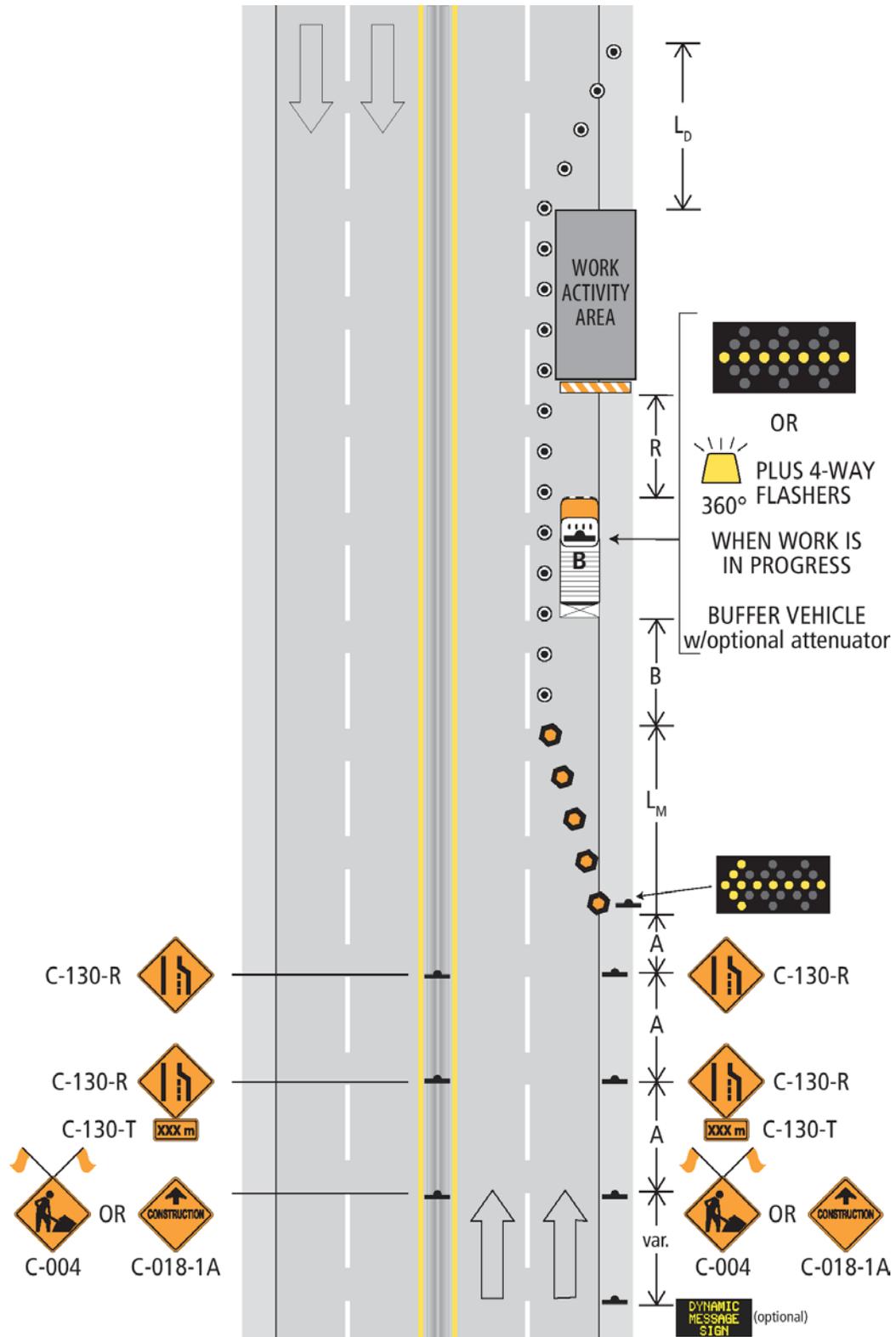
- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with [Table A – Taper Lengths](#).

Options:

- If the regular posted speed limit is ≤ 60 km/h:
 - The upstream Right Lane Closed C-130-R sign with distance tab may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 9.6: Right Lane Closed – Short and Long Duration



9.7 Left Lane Closed – Short and Long Duration

Purpose:

This layout shows the typical setup for closure of the left travel lane on a multilane divided highway.

Standard:

- A Left Lane Closed Ahead C-130-L sign with a C-130-T distance tab and a second Left Lane Closed Ahead C-130-L sign shall be placed in advance of the work.
- Where the posted speed limit is ≥ 70 km/h, a flashing arrow board (FAB) is required.

Guidance:

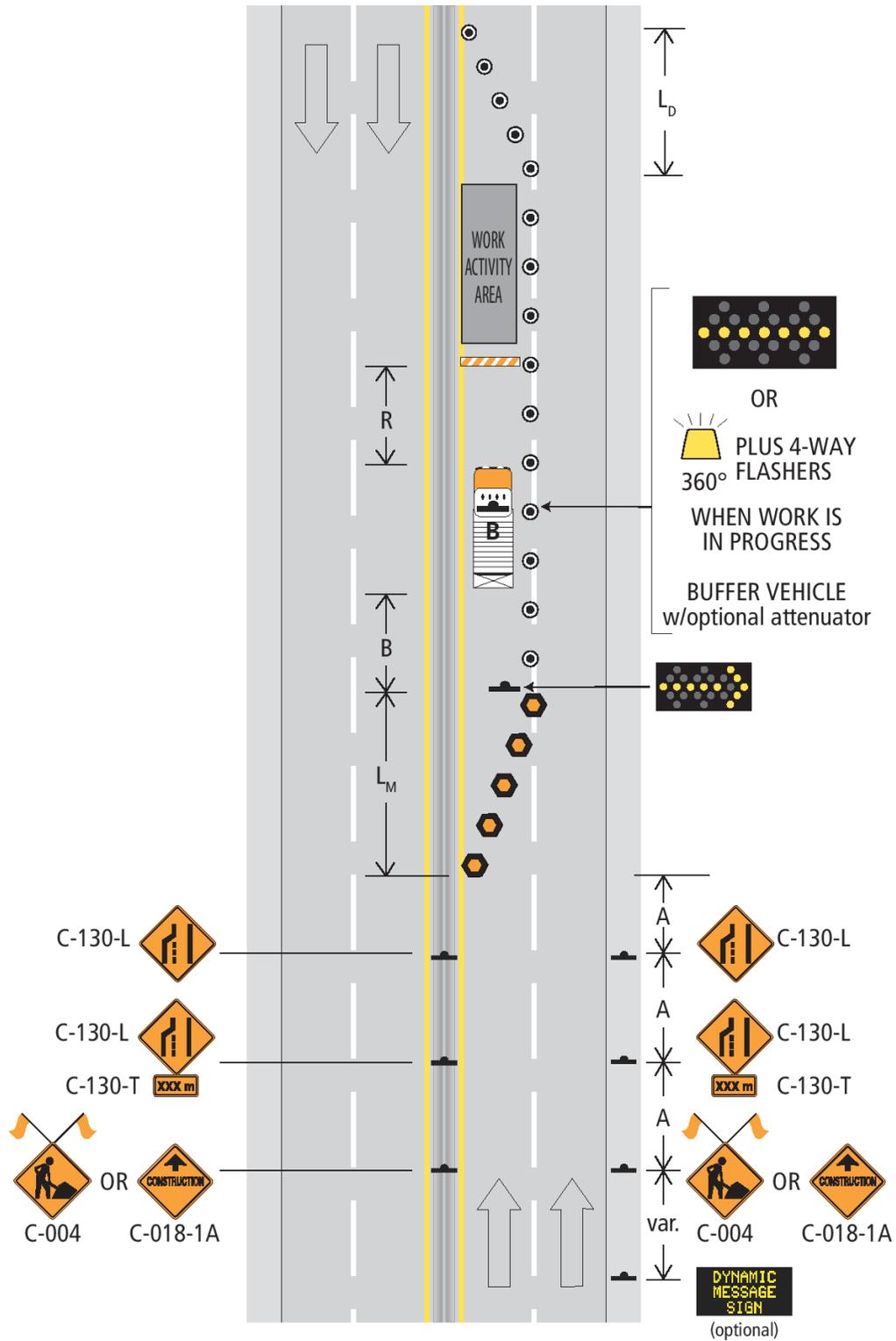
- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.

Options:

- If the regular posted speed limit is ≤ 60 km/h:
 - The upstream Left Lane Closed C-130-L sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 9.7: Left Lane Closed – Short and Long Duration



9.8 Centre Lane Closure (≤ 60 km/h) – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure of the centre lane on a low-speed multilane roadway.

Standard:

- A Centre Lane Closed Ahead C-030-1A sign with a C-130-T distance tab and a Centre Lane Closed C-030-2 sign are required in advance of the work.
- A buffer space shall be incorporated into the layout.

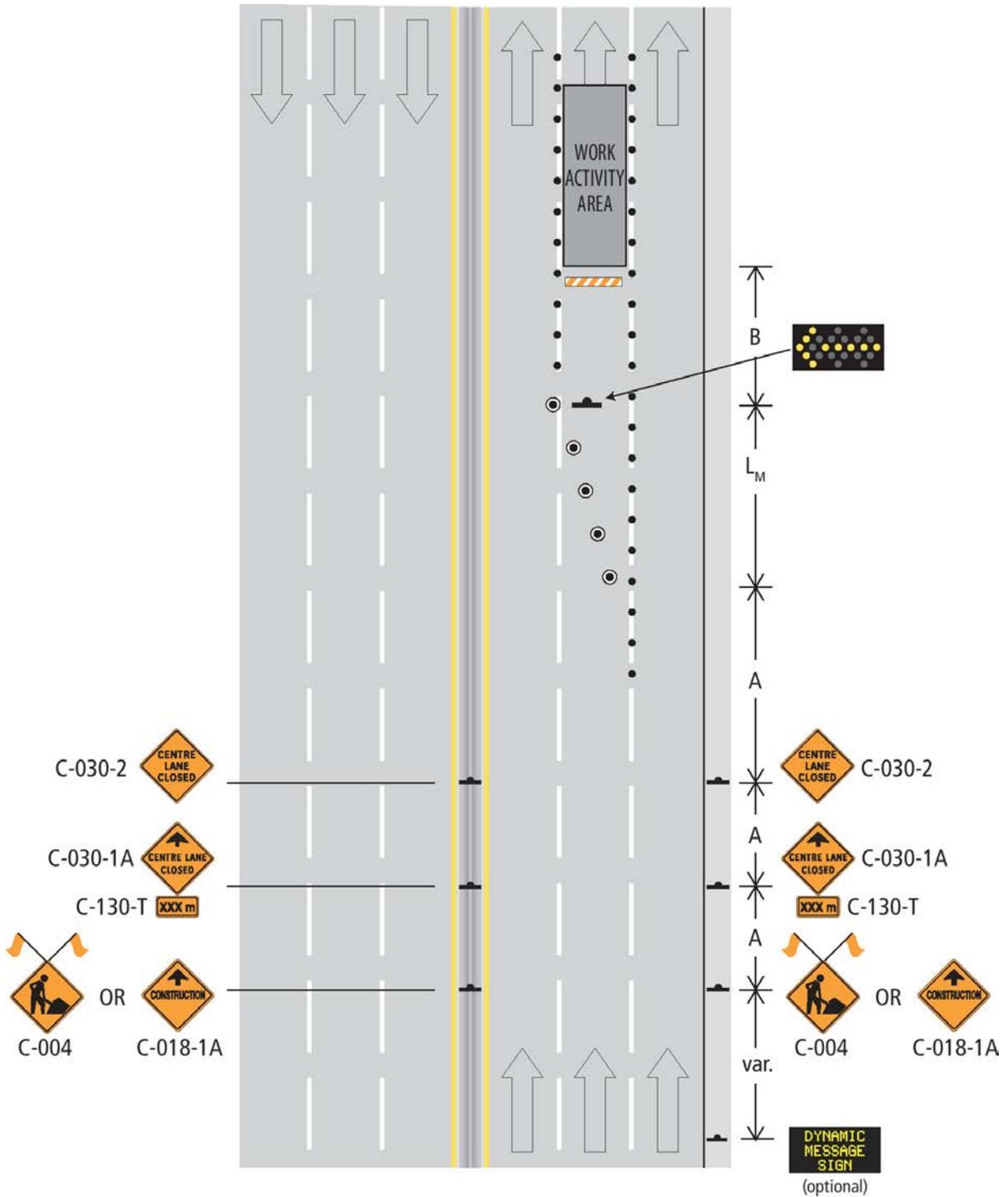
Guidance:

- The spacing of channelizing devices may be reduced to prevent traffic from entering the work area.
- Provided that traffic volumes are sufficiently low, it may be necessary to close two lanes to maintain adequate space for worker safety.
- If space is available, a short, single row of channelizing devices should be installed in advance of the traffic split to keep vehicles in their lanes.

Options:

- Signage may be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Interior lane traffic may be directed to either the left or the right lane by using a flashing arrow board (FAB) with the arrow pointing in the direction of the merge taper.

Figure 9.8: Centre Lane Closure (≤ 60 km/h) – Short and Long Duration



9.9 Centre Lane Closure (≥ 70 km/h) – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure of the centre lane on a high-speed multilane roadway.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign shall be placed in advance of the work.
- A Centre Lane Closed C-030-2 sign is required in advance of the lane shift.
- If signs are not installed on the divided median, a dynamic message sign (DMS) is required with the message “CENTRE LANE CLOSED”.
- Two flashing arrow boards (FABs) shall be used—one in each taper—as illustrated in the diagram.

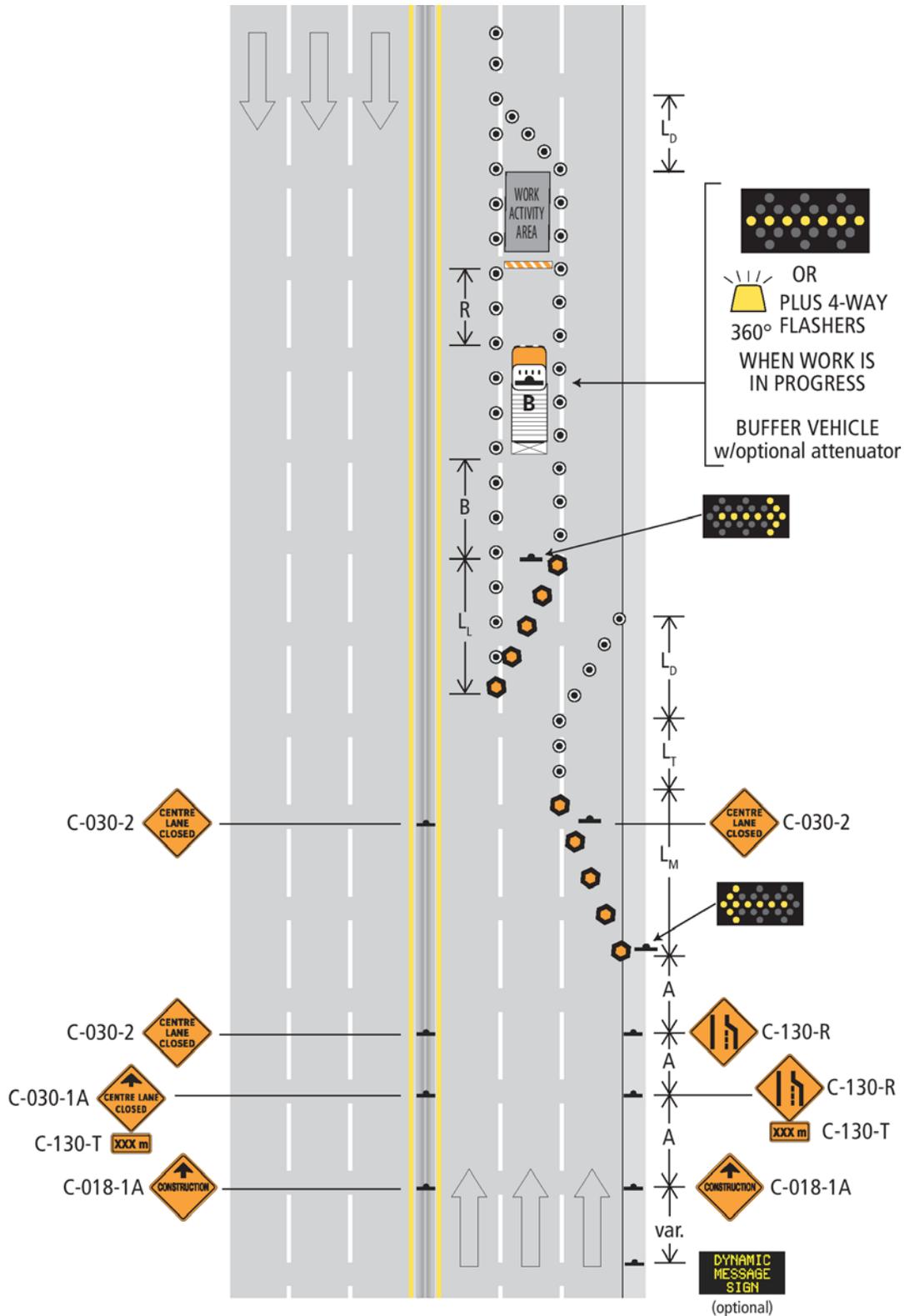
Guidance:

- If the alignment is such that the two flashing arrow boards (FABs) create confusion, the minimum tangent length (L_T distance) between the end of the merging taper and beginning of the shift taper should be extended so that road users can focus on one flashing arrow board (FAB) at a time.
- The spacing of channelizing devices may be reduced to prevent traffic from entering the work area.
- A double lane closure (leaving only one lane open) may be implemented if traffic volumes are sufficiently low, using a flashing arrow board (FAB) in the tapers for each closed lane.
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with [Table A – Taper Lengths](#).

Options:

- Interior lane traffic may be directed to either the left or the right lane by using a flashing arrow board (FAB) with the arrow pointing in the direction of the merge taper.

Figure 9.9: Centre Lane Closure (≥ 70 km/h) – Short and Long Duration



9.10.1 Double Right Lane Closure – Short and Long Duration

Purpose:

This layout shows the typical setup for the closure of two right lanes in a single travel direction on a multilane divided highway where at least one lane in the same direction of travel remains available to traffic.

For closures of multiple lanes, it is important that drivers have to navigate only one lane closure at a time (i.e., each closed lane will have a separate taper and merge setup). In other words, double lane closures should never require drivers to make two lane merges at one location.

Standard:

- Each lane shall be closed one at a time as shown in the layout.
- A separate flashing arrow board (FAB) shall be used for each closed lane.

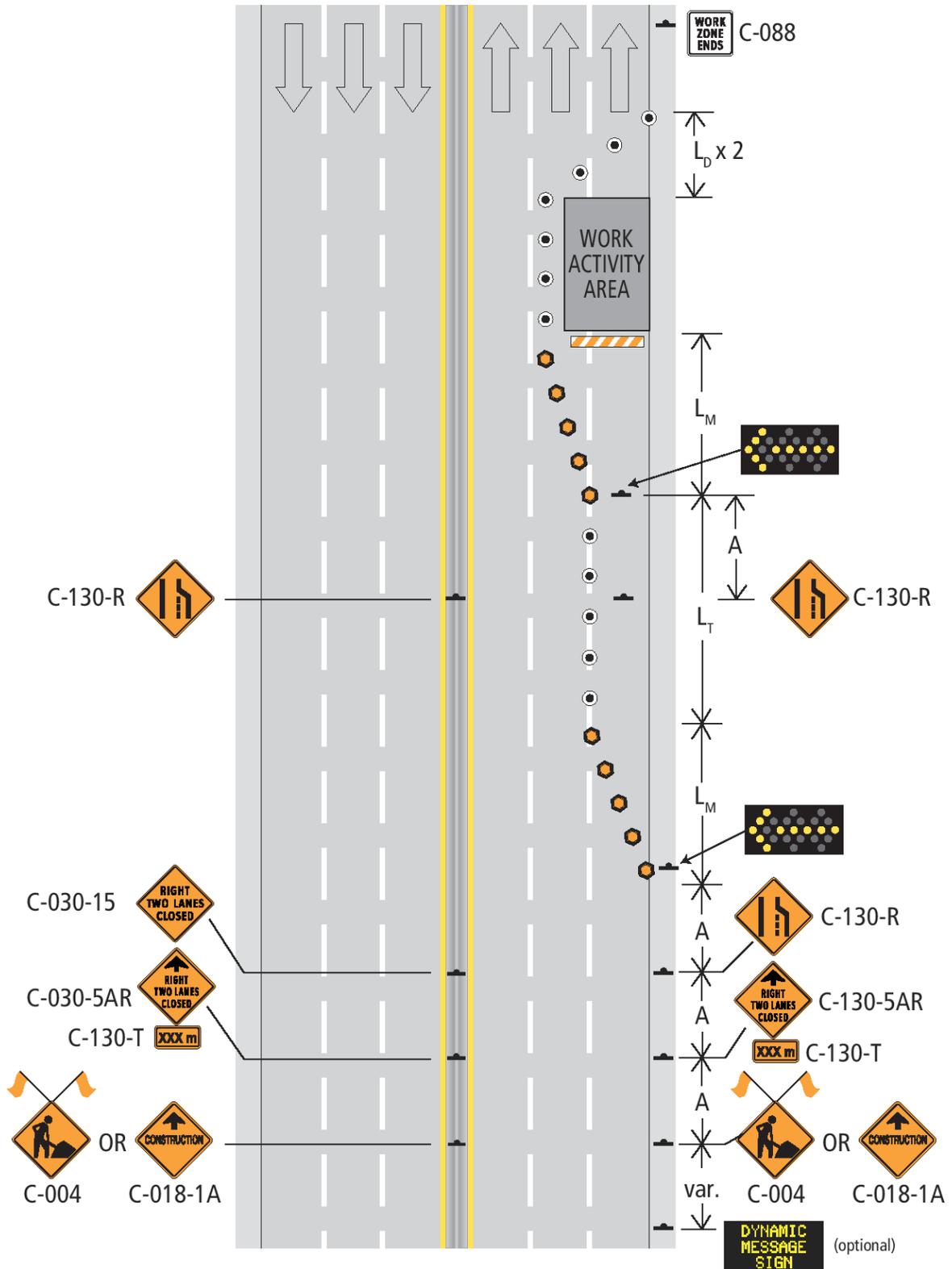
Guidance:

- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with [Table A – Taper Lengths](#).

Options:

- For long-duration work, a dynamic message sign (DMS) may be used in advance of the Construction Ahead C-018-1A sign.
- L_T and the positioning of the second FAB may be adjusted if the alignment creates confusion about which lane closure is being indicated by the second FAB.

Figure 9.10.1: Double Right Lane Closure – Short and Long Duration



9.10.2 Double Left Lane Closure – Short and Long Duration

Purpose:

This layout shows the typical setup for the closure of two left lanes in a single travel direction on a multilane divided highway where at least one lane in the same direction of travel remains available to traffic.

For closures of multiple lanes, it is important that drivers have to navigate only one lane closure at a time (i.e., each closed lane will have a separate taper and merge setup). In other words, double lane closures should never require drivers to make two lane merges at one location.

Standard:

- Each lane shall be closed one at a time as shown in the layout.
- A separate flashing arrow board (FAB) shall be used for each closed lane.

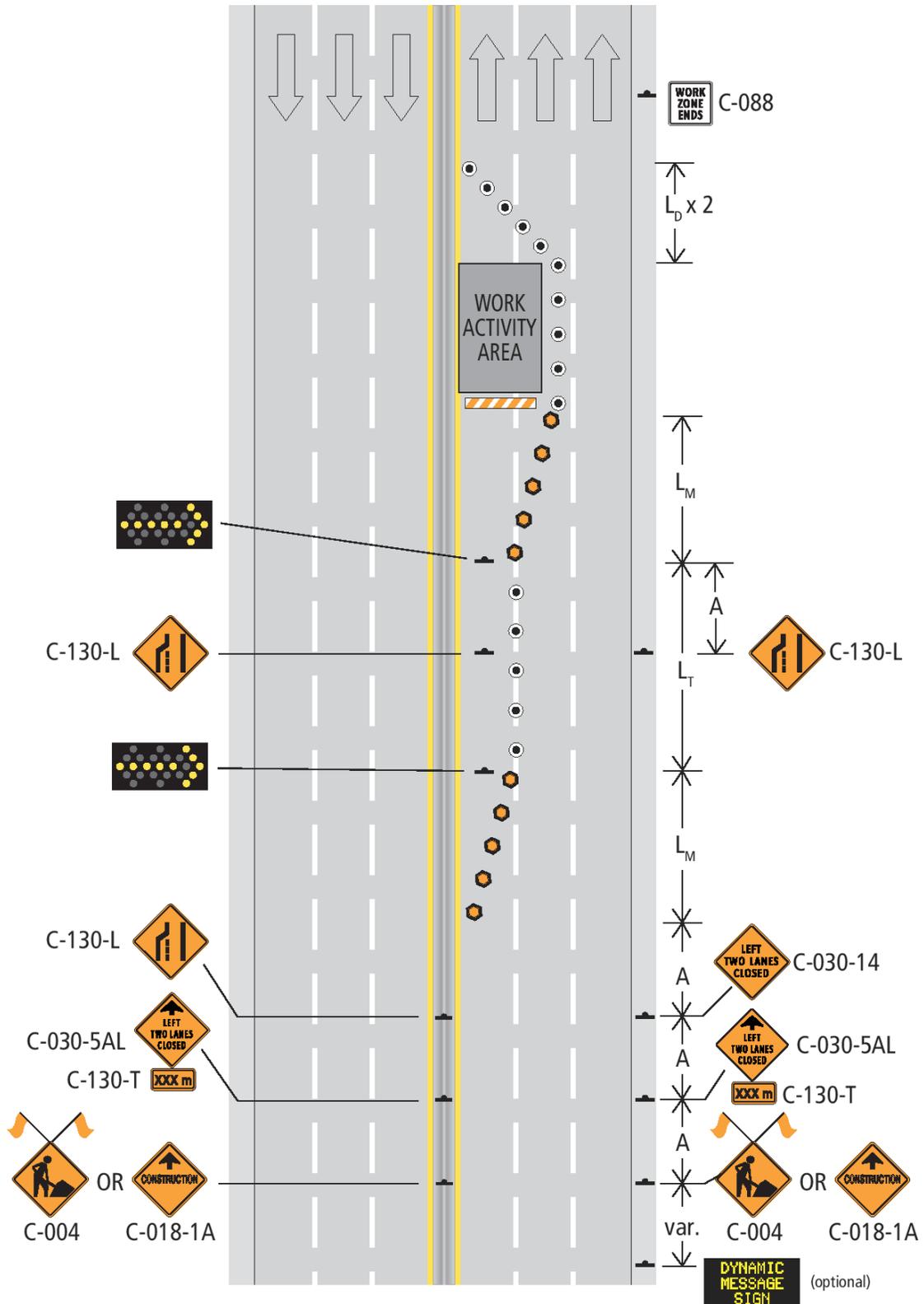
Guidance:

- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with [Table A – Taper Lengths](#).

Options:

- For long-duration work, a dynamic message sign (DMS) may be used in advance of the Construction Ahead C-018-1A sign.
- L_T and the positioning of the second FAB may be adjusted if the alignment creates confusion about which lane closure is being indicated by the second FAB.

Figure 9.10.2: Double Left Lane Closure – Short and Long Duration



9.11 Median Crossover – Short and Long Duration

Purpose:

This layout shows the typical setup for the closure of all lanes in an entire direction of travel on a multilane roadway. Traffic from the closed lanes is re-routed across the median into the opposing travel lane, reducing the number of lanes available for opposing traffic.

This layout reduces road capacity in both directions of travel so consideration shall be given to the best time of day for implementing this type of closure.

Standard:

- A Lane Closed Ahead C-130-L/R sign will be required for the left/right lane closure in advance of the work.
- Channelizing devices or temporary barriers shall be used to separate opposing traffic.
- Two-Way Traffic Ahead C-132 signs shall be used when concrete median barrier is not used to define the new centreline.
- If median barrier is removed to enable the median crossover, the remaining exposed barrier ends shall be marked by an appropriate Hazard C-154 marker and a Type B flasher.
- If the ends of the barrier will be exposed for longer than 48 hours, suitable end treatment shall be applied as determined by the Road Authority.
- If signs are not installed on the divided median, a dynamic message sign (DMS) is required.

Guidance:

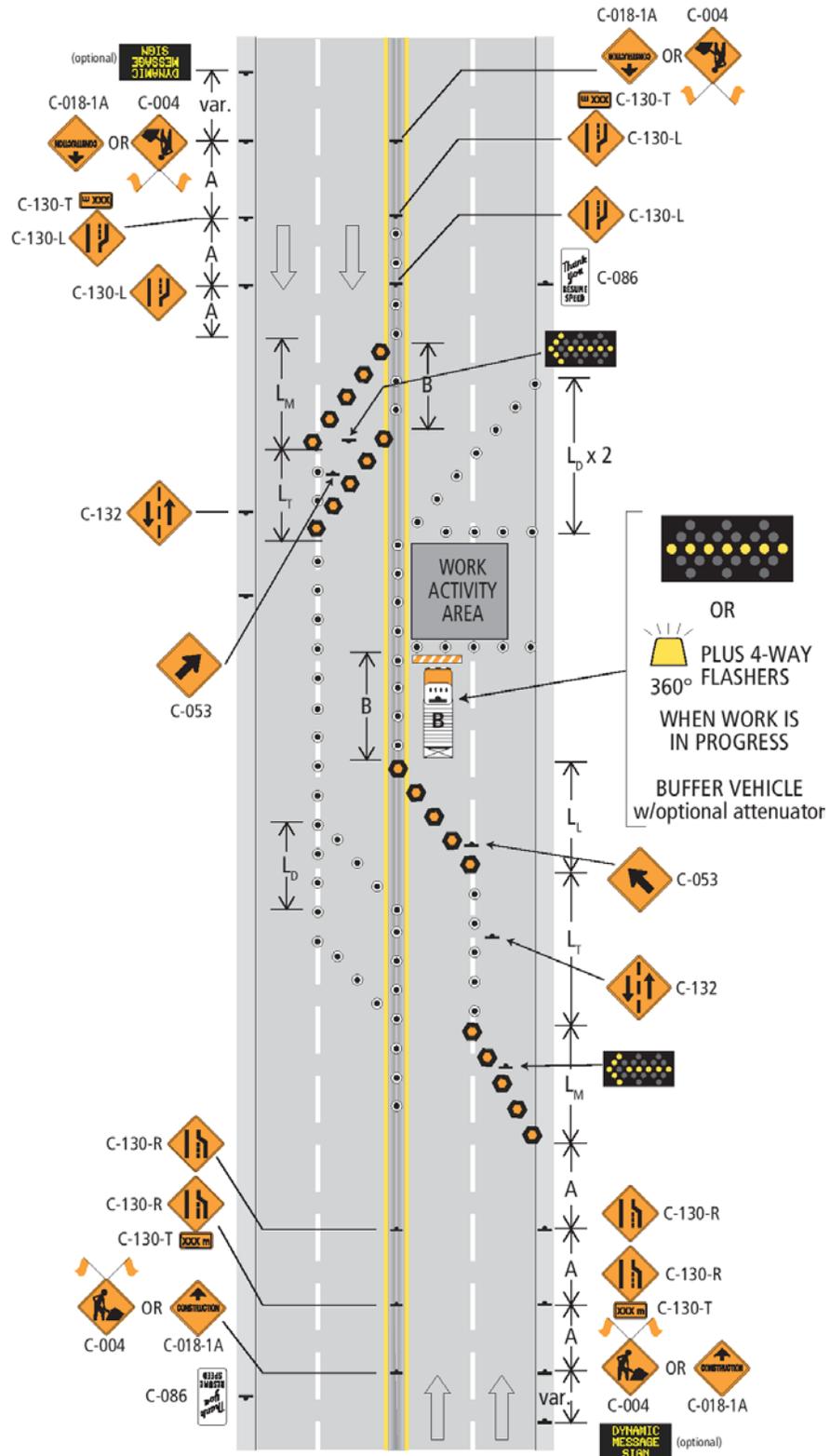
- Temporary crash attenuators should be used to protect the exposed ends of median barriers.
- The Barrier Removed C-069 sign should be used in advance of locations where the existing median barrier has been removed.
- When re-establishing normal traffic flow, remove the signs and devices for the diverted lanes first, and then remove the devices for the opposing lanes.
- A dynamic message sign (DMS) is recommended for night work over multiple night-time shifts.

Options:

- A custom Traffic Pattern Changed Zx-030 sign with an implementation plan on counterflow operations and transitions may be used as a supplement. See Zx-030 [Appendix B](#).
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 9.11: Median Crossover – Short and Long Duration



9.12 Lane Closure at Open Exit Ramp – Short and Long Duration

Purpose:

This layout shows the typical setup where there is a lane closure in the vicinity of an exit ramp but the ramp itself remains open.

The presence of construction activity and traffic control devices associated with the lane closure may cause driver uncertainty about the status of the exit ramp so it is important to use appropriate delineation and signage to let drivers know in advance—and at the exit—that the exit is open.

Standard:

- The Exit Open C-204 sign with a C-130-T distance tab shall be used in advance of the open exit to identify the distance to the new exit point.
- An additional Exit Open C-204 sign shall be used in advance of the new exit point.

Guidance:

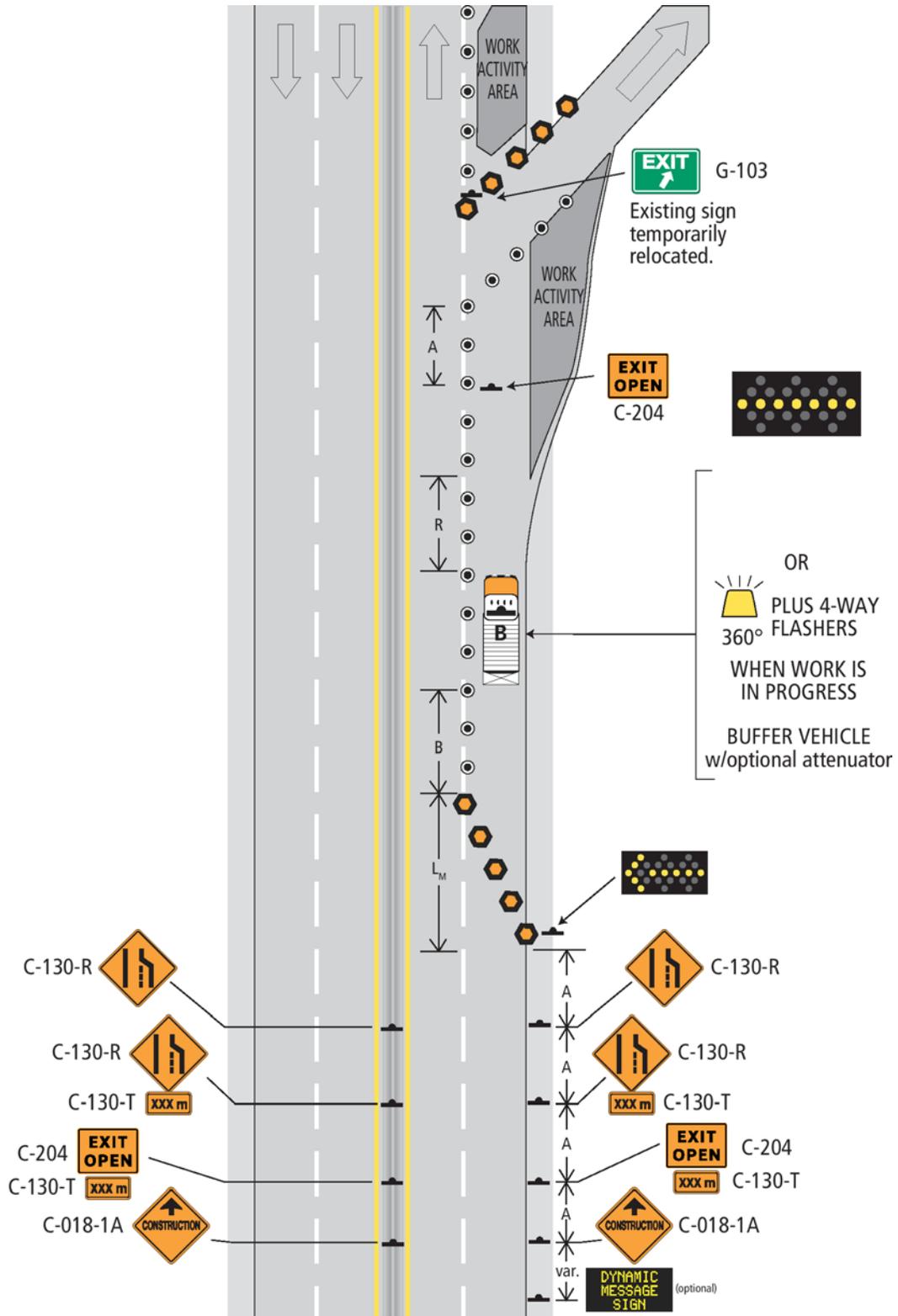
- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- The Exit G-103 sign should be used at the temporary exit to define the exit point, mounted over temporary channelizing devices in a manner that makes it highly visible to drivers.
- A dynamic message sign (DMS) is recommended for night work over multiple night-time shifts.
- Channelizing devices used to define the path to the exit ramp should be tapered so that they are consistent with the ramp approach.

Options:

- A dynamic message sign (DMS) may be used to advise drivers that the exit is open.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 9.12: Lane Closure at Open Exit Ramp – Short and Long Duration



9.13 Lane Closure at Open Entrance Ramp – Yield Condition – Short and Long Duration

Purpose:

This layout shows the typical setup where there is a lane closure in the vicinity of an entrance ramp but the ramp remains open. Construction activity near the entrance ramp may necessitate changing how vehicles enter the highway.

This layout specifically illustrates a yield condition for the entrance ramp. A yield condition shall be implemented when sufficient length cannot be maintained for a merge condition.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign are required in advance of the entrance ramp.
- A Merging Traffic Ahead C-136-R sign is required in advance of the entrance ramp to advise drivers that traffic is merging from the right in the new location.
- The entrance ramp requires a Crew Working Ahead C-004 sign or a Construction Ahead C-018-1A sign and a Yield R-002 sign to advise those entering the roadway that they are in a yield condition.

Guidance:

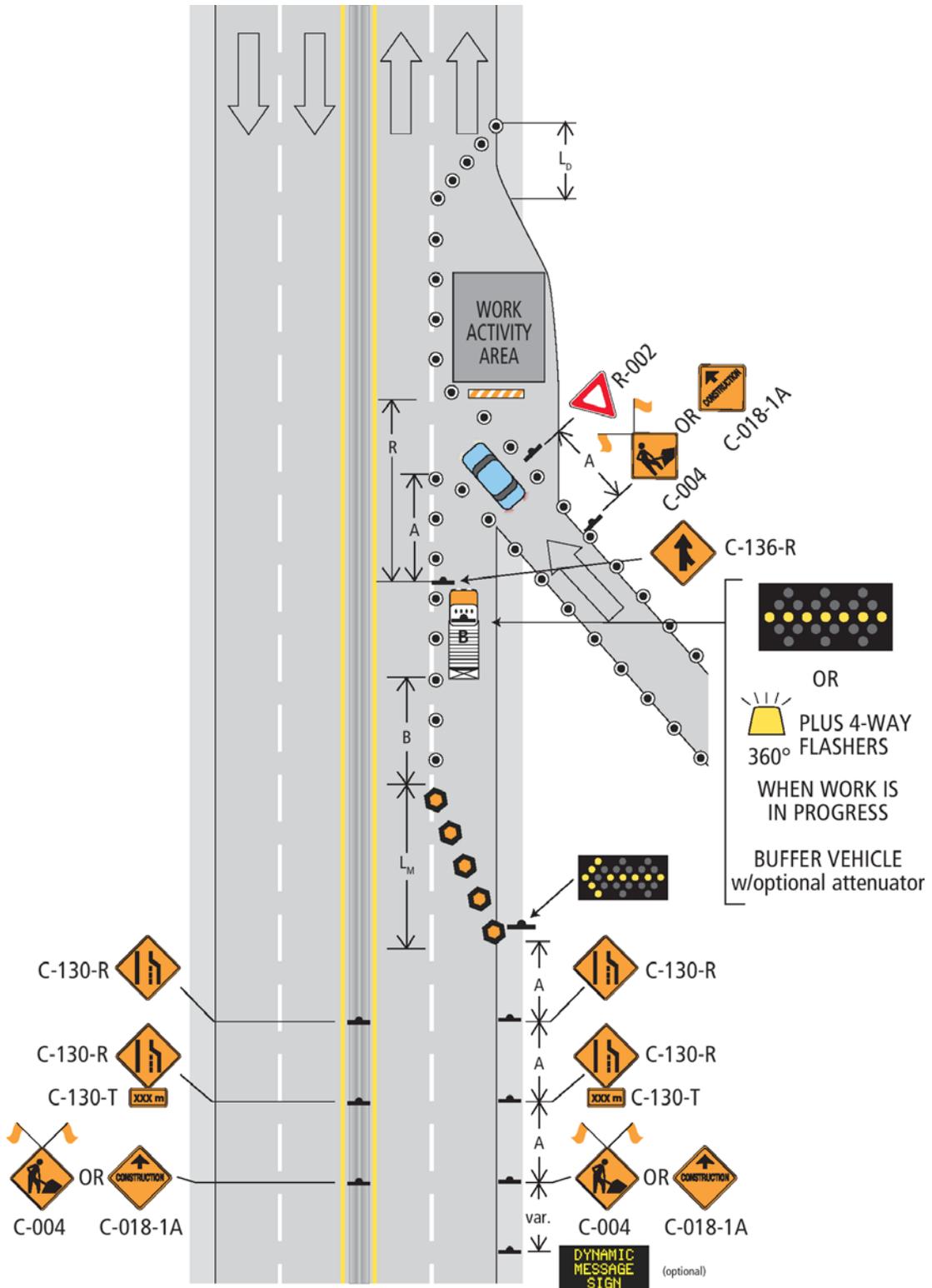
- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- The Yield R-002 sign should be positioned so that ramp traffic has adequate sight distance to select an acceptable gap in the traffic flow but not so far forward that drivers are tempted to stop in the major road traffic path.
- If insufficient gaps are available, consideration should be given to closing the ramp.
- Signs and devices should be positioned so they do not block major road drivers' view of the Merging Traffic C-136-R sign and the merging traffic.
- A dynamic message sign (DMS) is recommended for night work over multiple night-time shifts.

Options:

- If there is a construction speed limit in place, consider installing a confirmatory Maximum Speed Limit R-004 sign with a Construction Speed Limit C-080-T tab downstream of the on-ramp.
- To improve sight distance for the merging traffic, tubular markers between the ramp and the leading taper may be substituted with cones.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 9.13: Lane Closure at Open Entrance Ramp – Yield Condition – Short and Long Duration



9.14 Lane Closure at Open Entrance Ramp – Merge Condition – Short and Long Duration

Purpose:

This layout shows the typical setup where there is a lane closure in the vicinity of an entrance ramp but the ramp remains open. Construction activity near the entrance ramp may necessitate changing how vehicles enter the highway.

This layout specifically illustrates a merge condition for the entrance ramp, which means that drivers entering the highway from the ramp are still able to use an acceleration lane to merge into traffic.

It is generally preferable to maintain ramp operations using a merge condition if an acceleration lane of sufficient length can be maintained.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign are required in advance of the entrance ramp.
- A Merging Traffic Ahead C-136-R sign is required along the work zone tangent and in advance of the new entrance ramp location to advise drivers that traffic is merging from the right in the new location.
- An acceleration lane of sufficient length shall be provided for a merge condition.

Guidance:

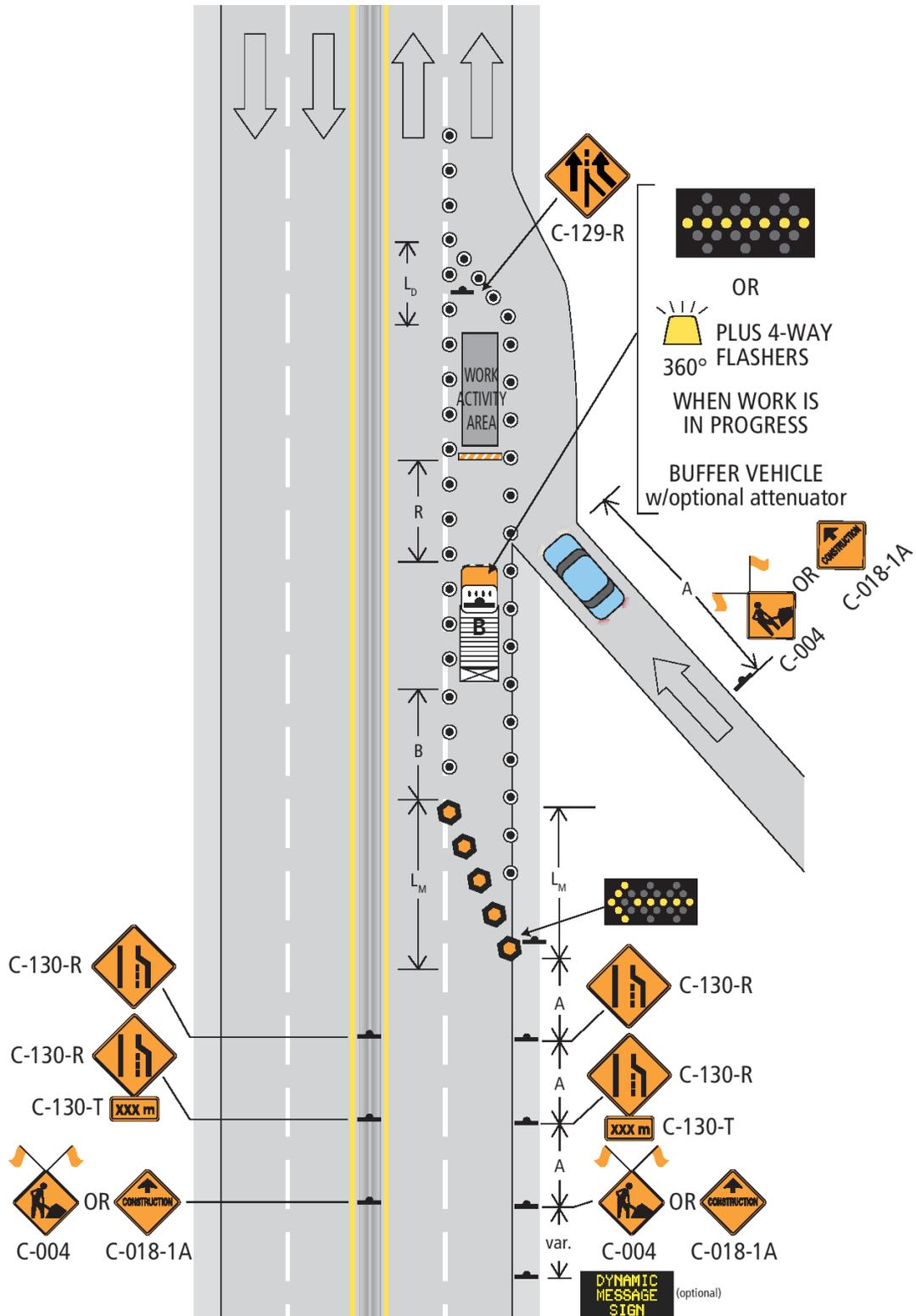
- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Signs and devices should be positioned so that they do not block major road drivers' view of the Merging Traffic C-136-R sign and the merging traffic.
- A dynamic message sign (DMS) is recommended for night work over multiple night-time shifts.

Options:

- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 9.14: Lane Closure at Open Entrance Ramp – Merge Condition – Short and Long Duration



9.15 Temporary Closure of Exit Ramp – Short and Long Duration

Purpose:

This layout shows the typical setup where an exit ramp is closed.

The presence of construction activity and traffic control devices associated with the lane closure may cause driver uncertainty about the status of the exit ramp so it is important to use appropriate delineation and signage to let drivers know in advance—and at the exit—that the exit is closed.

It is important to clearly block off the entrance to the closed exit ramp and any deceleration lane.

Standard:

- The Exit Closed Ahead C-205-A sign shall be used in advance of a temporarily closed exit ramp.
- Drums shall be used to close off the deceleration lane and the exit ramp.
- An Exit Closed C-062 banner shall be attached to the existing Exit G-103 sign to indicate the closure.

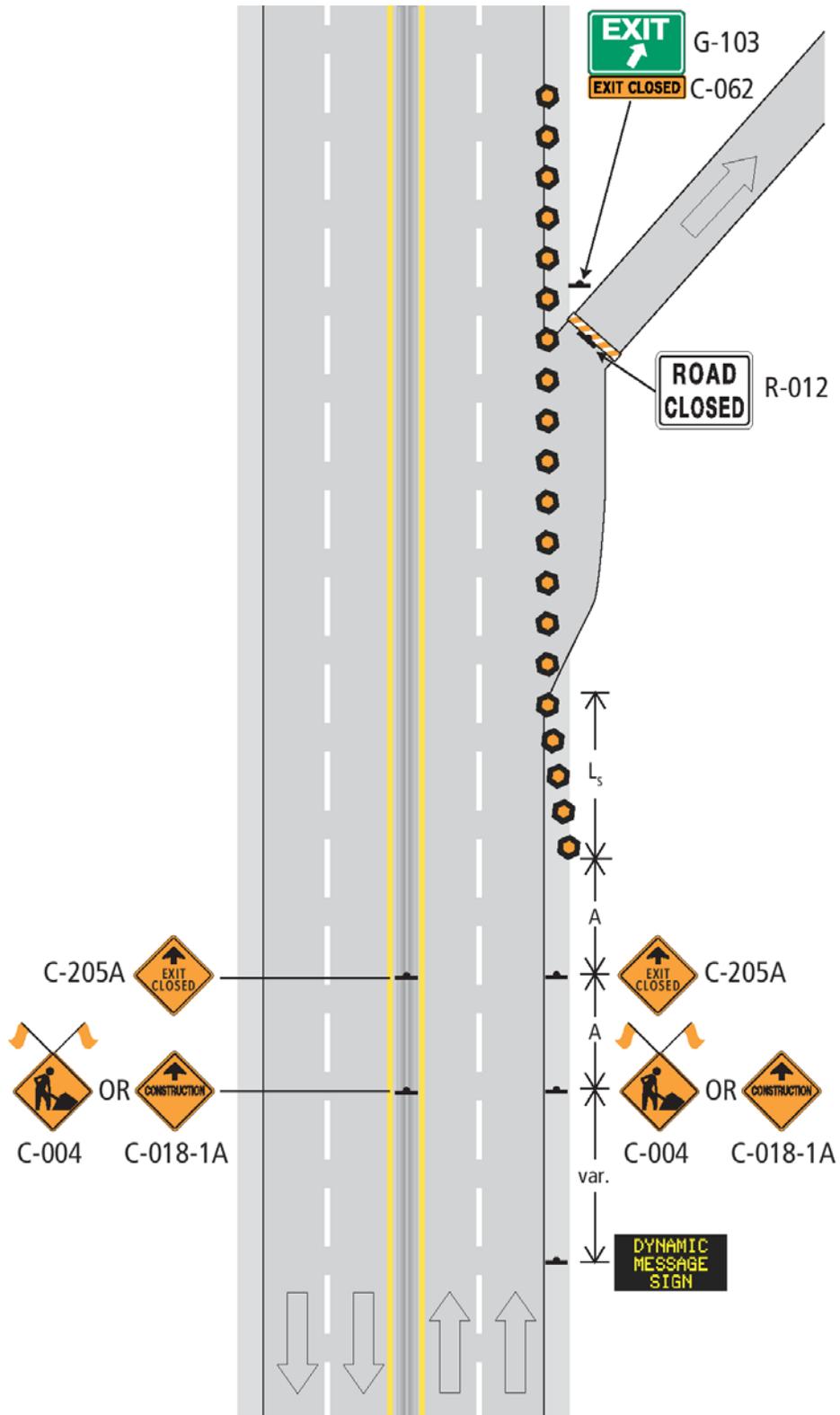
Guidance:

- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Additional Exit Closed Ahead C-205-A signs may be required for higher-volume routes.
- Exit Closed C-062 banners should be used for long-duration closures, overlaid across existing G-5 (exit information) signs at a 45-degree angle.
- When planning the temporary closure of an exit ramp, consideration should be given to where traffic will go when it cannot use the exit.
- Alternative exit(s) should be identified to drivers by using dynamic message signs (DMS).

Options:

- A Distance C-130-T tab may be used with the Exit Closed Ahead C-205-A sign if the exit is not visible ahead or there are multiple exits in close proximity.
- For longer duration closures, roadside barriers may be used instead of flexible drums to close the exit.
- For longer duration closures, custom signs or additional dynamic message signs (DMS) providing information on alternative exit(s) may be used.
- Roadside barriers may be offset from the fog line by at least one metre and may include crash attenuation or an appropriate approach flare.
- Where permanent overhead dynamic message signs (DMS) are located in advance of the closure, exit closure information may also be provided on these signs.

Figure 9.15: Temporary Closure of Exit Ramp – Short and Long Duration



9.16 Runaway Lane Open – Short and Long Duration

Purpose:

Runaway lanes are emergency escape ramps created for long, descending grades. On such grades, vehicle speeds may increase and brakes may overheat and fail because of the extensive braking used to slow the vehicle. The runaway lanes allow vehicles with brake problems to exit the roadway and stop. Runaway lanes should be kept open whenever possible because of their importance for roadway safety.

This layout shows the typical setup for work adjacent to a runaway lane that remains open. Effort should be made to **clearly communicate the open status of the runaway lane** to truck drivers and other approaching motorists.

Standard:

- Construction equipment shall never be left parked in—or blocking access to—an open runaway lane.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign shall be placed in advance of the exit ramp.
- A flashing arrow board (FAB) shall be placed inside the taper.
- A buffer space shall always be used.
- A dynamic message sign (DMS) shall be used to communicate the runaway lane status.

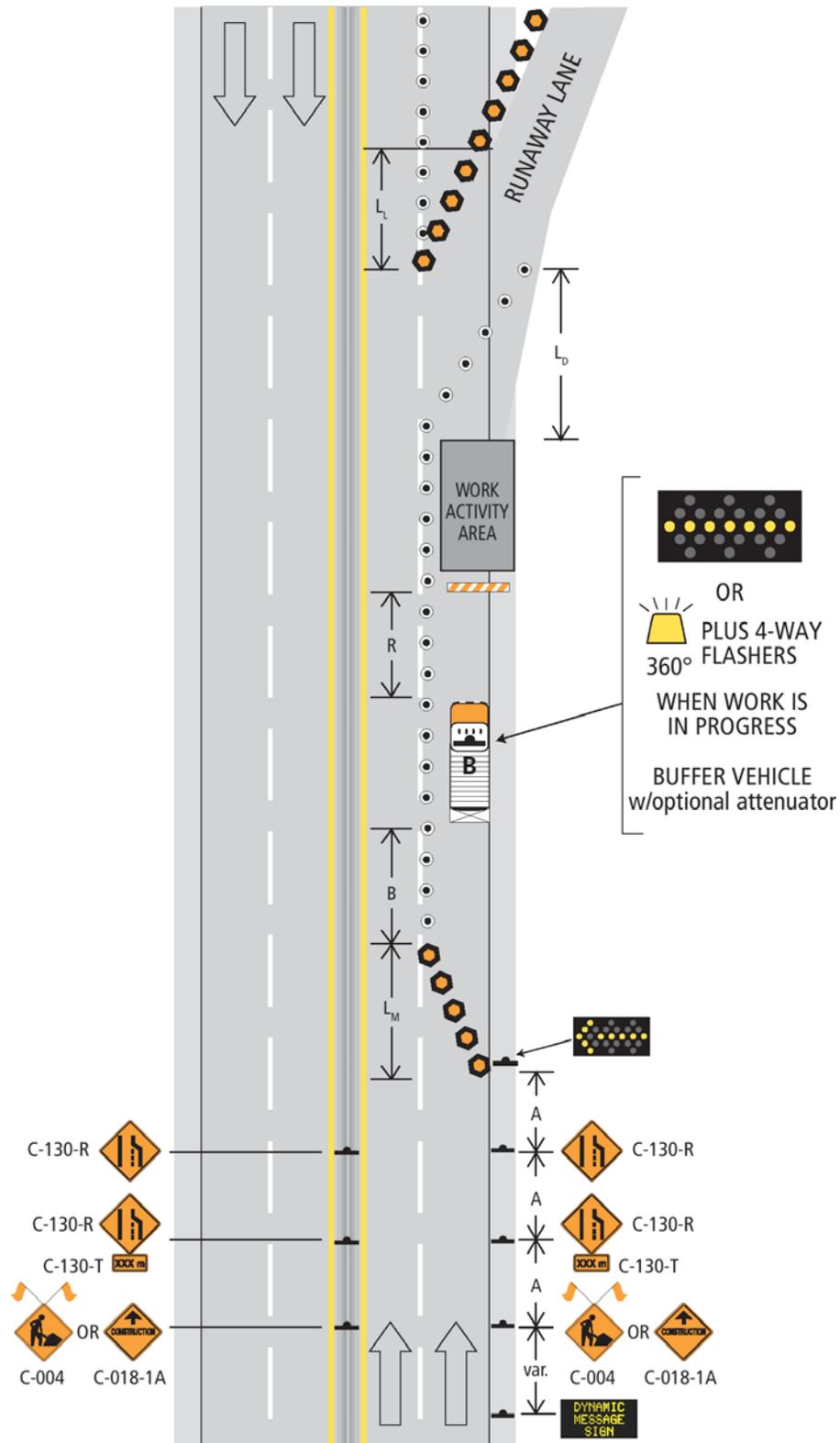
Guidance:

- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.
- Vehicles should not be queued in advance of—or through—the entrance to a runaway lane.

Options:

- None at this time.

Figure 9.16: Runaway Lane Open – Short and Long Duration



9.17 Runaway Lane Closed – Short and Long Duration

Purpose:

Runaway lanes are emergency escape ramps created for long, descending grades. On such grades, vehicle speeds may increase and brakes may overheat and fail because of the extensive braking used to slow the vehicle. The runaway lanes allow vehicles with brake problems to exit the roadway and stop. Runaway lanes should be kept open whenever possible because of their importance for roadway safety.

This layout shows the typical setup for work in front of a runaway lane that is closed. When work is occurring in front of runaway lanes, effort shall be made to clearly communicate the closed status of the runaway lane to truck drivers and other approaching motorists.

Even if a runaway lane is closed, extreme caution should be used when working in front of or across the runaway lane. Never assume that just because it is considered closed, a truck would not attempt to use it in an emergency.

Standard:

- Truck drivers shall be notified of runaway lane closures at (within or in advance of) the brake check and in advance of the grade.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab and a second Right Lane Closed Ahead C-130-R sign shall be placed in advance of the entrance ramp.
- The Runaway Lane Closed C-067 sign shall be positioned 200 metres or distance A, whichever is greater, in advance of the affected runaway lane. It shall be removed or covered as soon as possible once the runaway lane is available.
- For construction zones across runaway lanes, use the Closed C-061 tab mounted above or across the existing runaway signs.
- A dynamic message sign (DMS) shall be used to communicate the runaway lane closure. Appropriate positioning and messaging should be discussed with the Road Authority.
- A buffer space shall always be used.

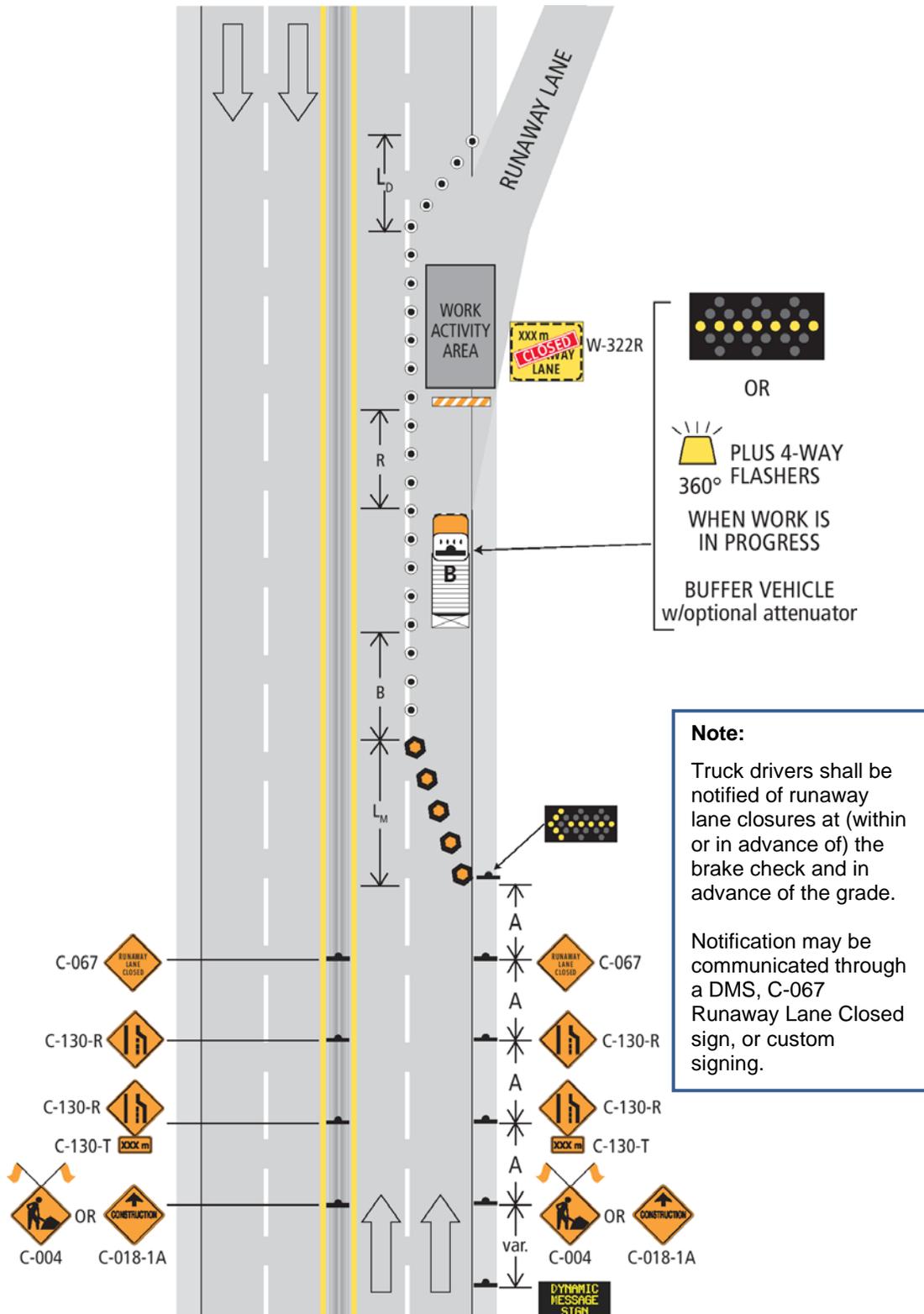
Guidance:

- Signage should be installed along the divided median. If the median space is limited, smaller sized signs may be used.
- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.
- Vehicles should not be queued in advance of—or through—the entrance to a runaway lane.
- If a lane closure is not required, the Right Lane Closed Ahead C-130 series and flashing arrow board (FAB) can be removed.

Options:

- Notification at the brake check may be communicated through a dynamic message sign (DMS), C-067 Runaway Lane Closed sign, or custom signing.

Figure 9.17: Runaway Lane Closed – Short and Long Duration



9.18 Lane Closure with Zipper Merge Signing (Queues < 800 m)

Purpose:

Late merge signs (zipper merge) may be used as an alternate to standard lane closure guidelines in high volume areas where queuing conditions are expected. Late merge signs encourage drivers to utilize both lanes until a merge point which improves efficiency by reducing congestion and aggressive driving. Late merge signs should not be used within intersections or on sharp horizontal or vertical curves. This layout shows the typical setup of late merge signs for the closure of a left travel lane on a multilane undivided highway.

For locations where queueing may extend more than 800 m upstream of the taper, refer to [Section 9.19: Lane Closure with Zipper Merge Signing \(Queues ≥ 800 m\)](#).

Standard:

- A Lane Closed Ahead C-130 sign with a C-130-T distance tab is required on both sides of the roadway
- A barricade is required on the approach side of the work activity for long-duration work

Guidance:

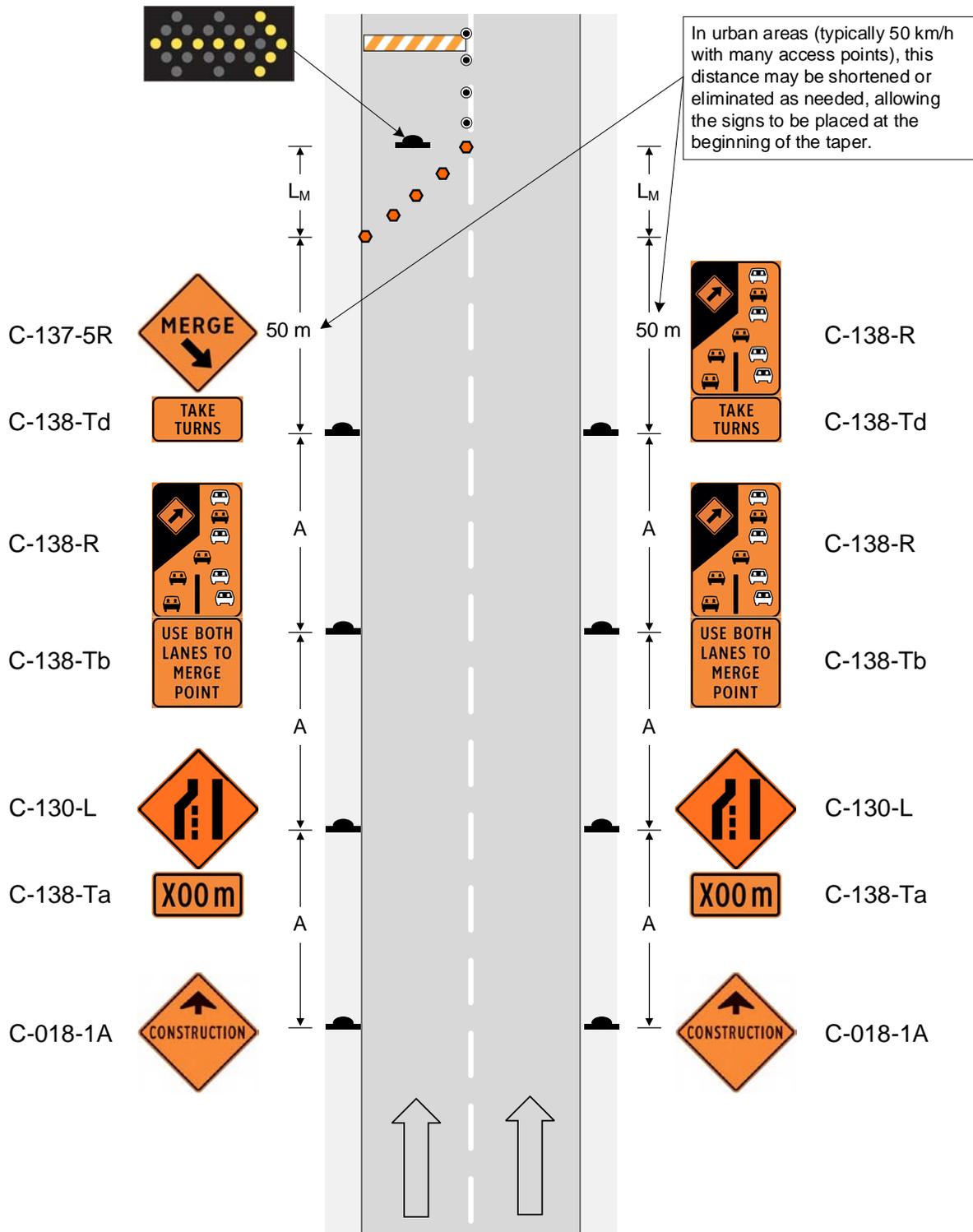
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with [Table A – Taper Lengths](#)

Options:

- Additional confirmatory Zipper Merge C-138-LR signs with accompanying C-138-Ta distance tabs may be used with a maximum 2km spacing where queuing extends beyond the C-130 signs or as considered necessary
- If the regular posted speed limit is ≤ 60 km/h, tubular markers may be used for leading tapers instead of drums.
- Dynamic message sign (DMS) may be used in place of the first set of C-138-LR and accompanying C-138-Tb (on both sides of roadway) but should include the messaging “Zipper Merge. Use Both Lanes to Merge Point,” or similar
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 9.18: Lane Closure with Zipper Merge Signing (Queues < 800 m)



9.19 Lane Closure with Zipper Merge Signing (Queues \geq 800 m)

Purpose:

The late merge (zipper merge) sign layouts are alternatives to standard lane closure set-ups on multilane divided highways. The goal of the zipper merge sign layout is to achieve better lane utilization and merging behavior to minimize delays and lengths of queues.

Late merge signs encourage drivers to utilize both lanes until a merge point. The signs also seek to improve merge behaviour (take turns) which will improve efficiency and safety by reducing congestion and aggressive driving. Late merge signs should not be used within intersections or on sharp horizontal or vertical curves.

This layout shows the typical late merge signage for the closure of a left travel lane on a multilane divided highway. This layout may be used where the regular posted speed limit is \geq 70 km/h and traffic queues may extend \geq 800 m upstream of the taper.

Standard:

- Signs shall be placed on both the left and right side of the roadway.
- A barricade is required on the approach side of the work activity for long-duration work

Guidance:

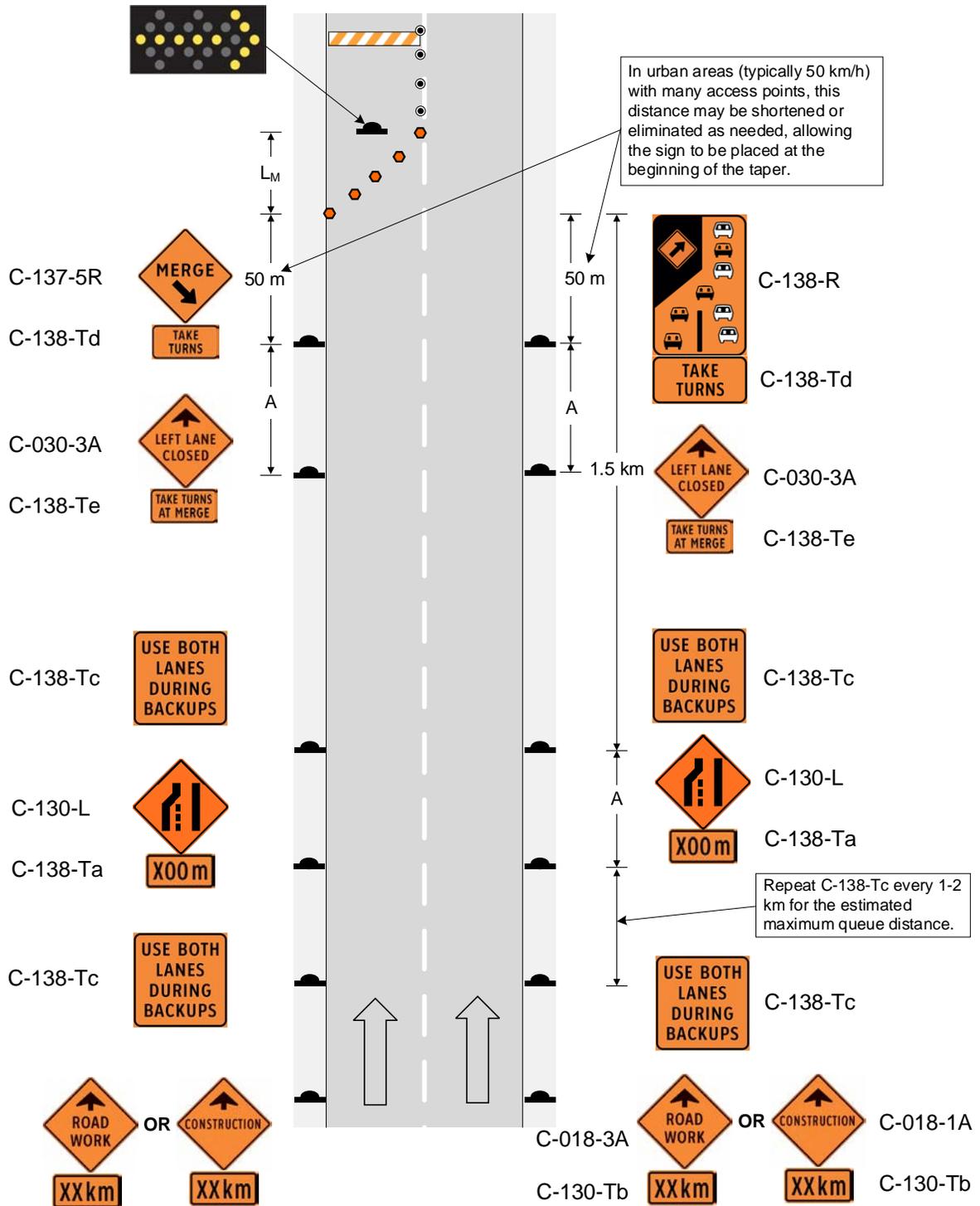
- The Road Work Ahead C-018-3A or Construction Ahead C-018-1A signs should be placed outside the location of where the maximum queue distance is anticipated to develop.
- Distance advisory tabs should be utilized with the Road Work Ahead C-018-3A or Construction Ahead C-018-1A signs to inform drivers where the merge location is located.
- For queue lengths greater than 1.5 km, adding additional Use Both Lanes During Backups C-138-Tc signs improves driver compliance.
- Where shoulders are wide and may be mistaken for travel lanes, shoulder tapers should be considered and installed in accordance with [Table A – Taper Lengths](#).

Options:

- Additional confirmatory Zipper Merge C-138-LR signs with accompanying C-138-Ta distance tabs may be used with a maximum 2km spacing where queuing extends beyond the C-130 signs or as considered necessary
- If the regular posted speed limit is \leq 60 km/h, tubular markers may be used for leading tapers instead of drums.
- A dynamic message sign (DMS) with similar messaging may be used in place of a pair of USE BOTH LANES DURING BACKUPS C-136-T7 signs
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
\leq 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
\geq 70 km/h	No substitution.	

Figure 9.19: Lane Closure with Zipper Merge Signing (Queues ≥ 800 m)



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PART B – TRAFFIC CONTROL

Section 10: Traffic Control Layouts – Mobile Work

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PART B – TRAFFIC CONTROL

Section 10: Traffic Control Layouts – Mobile Work

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

10.1 General Information - Mobile Work

Mobile work is an operation that is either continuously slow-moving work or intermittently-moving work with short stops. It may include:

- shouldering
- gravel road grading
- multiple pothole patching
- mowing
- brushing
- sweeping
- hydro-seeding
- sign cleaning
- litter bag pick-up
- spraying for dust control
- concrete barrier scupper flushing

Mobile work does not include debris removal or emergency response.

Traffic control devices are typically vehicle-mounted and include Slow Vehicle Next X km C-044 signs with the specified distance not exceeding 8 kilometres (the distance between the two C-044 signs in opposing directions) or Truck Stopped on Road Next 2 km C-038 signs.

If an advance Slow Vehicle Next X km C-044 sign is not used, a shadow vehicle with vehicle-mounted traffic control devices is required.

The distance between the work and shadow vehicles is typically Distance A found in Table B. It may vary on the basis of site factors such as traffic volume, sight distance, and terrain.

Table D shall be used to determine whether or not the operation is mobile work.¹

TABLE D – MINIMUM DISTANCES FOR MOBILE WORK						
Minimum Distance Moved (m) Every 30 Minutes	Regulatory Speed Limit (km/h)					
	≤50	60	70 - 80	90	100	≥ 110
	100	130	170	220	260	300

Table D Notes
To be considered mobile work, the operation shall move at least the distance shown in Table D for the posted speed limit every 30 minutes or less.
If the work does not regularly move the specified distance, it should be treated as a stationary operation, and the appropriate layout should be used.

¹ Table D values are derived from the Minnesota Department of Transportation’s Temporary Traffic Control Manual (2011).

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- All work and shadow vehicles shall be equipped with a flashing arrow board (FAB) in caution mode, a 360 degree flashing light, and 4-way flashers.
- Work and shadow vehicles shall display rear-mounted Slow Moving Vehicle C-036 signs.

Guidance:

- All temporary signs should be removed or covered when work is not under way.
- When the regular posted speed limit is ≥ 70 km/h, a rear-mounted crash attenuator is recommended for the shadow vehicles.

Options:

- A portable dynamic message sign (DMS) may be used to provide advance messaging for drivers.

10.2 Continuously Slow-Moving Work – Two-Lane, Two-Way Roadway

Purpose:

Continuously slow-moving work is done while continuously moving at slow speeds. These operations normally do not involve stopping, but infrequent stops of up to 15 minutes may occur.

Examples include:

- shouldering
- mowing
- sweeping
- concrete barrier scupper flushing
- gravel road grading
- spraying for dust control
- hydro-seeding
- brushing

For pavement marking layouts (i.e., intersection marking and quick-dry pavement marking), see [Section 14: Traffic Control Layouts – Pavement Marking](#).

Standard:

- Work and shadow vehicles shall display Yield to Oncoming Traffic R-56-1 signs.
- Slow Vehicle Next X km C-044 signs shall be used, and they shall be moved as the work progresses so that the work vehicle remains within the distance indicated on the signs.
- If the speed limit is ≥ 70 km/h, a shadow vehicle displaying the Slow Vehicle(s) Ahead C-045-X sign is required.

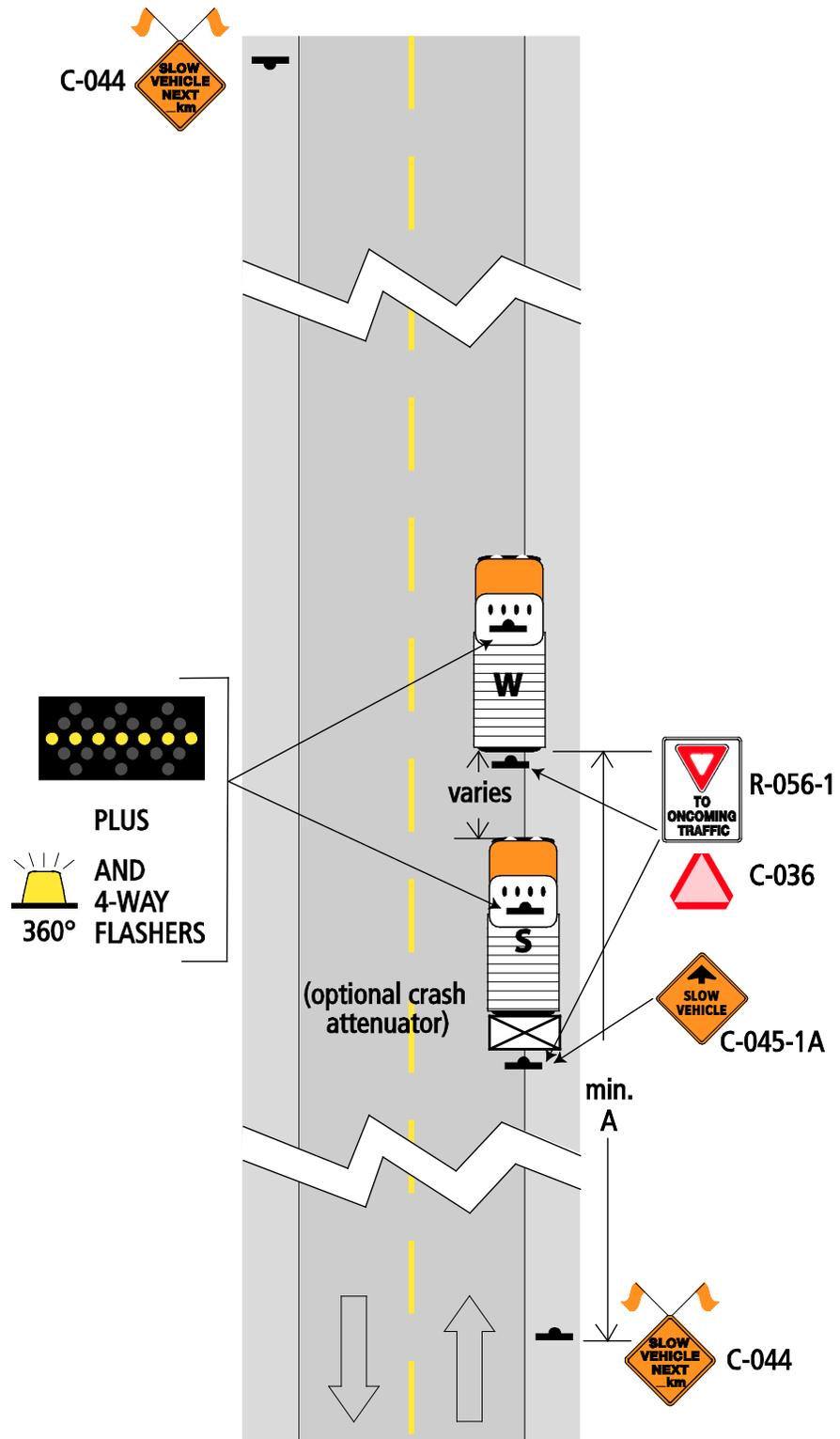
Guidance:

- The distance on Slow Vehicle Next X km C-044 signs should not exceed 8 kilometres.
- Work and shadow vehicles should pull over periodically to allow queued traffic to pass.
- The shadow vehicle should keep as far right as practicable, but may encroach into the travel lane when the shoulder is too narrow to drive on.
- Work vehicles may travel at posted speeds when work is not under way.

Options:

- The shadow vehicle may be omitted for work on low volume roadways (<1000 vpd) with a speed limit ≤ 80 km/h. These are typically non-numbered highways and may include rural highways with statutory speed limits of 80 km/h and appropriate sight distances.
- The Slow Vehicle(s) Ahead C-045-X sign may be replaced with other appropriate signs related to the type of work (see [Appendix B: Standard Construction Signs](#)).
- If the speed limit is ≤ 60 km/h:
 - For low-volume roadways, the Slow Vehicle Next X km C-044 sign and/or shadow vehicle and its accessories may be omitted.
 - The flashing arrow board (FAB) on the work vehicle may be omitted but the 360-degree flashing light and 4-way flashers are always required.
- The Yield to Oncoming Traffic R-056-1 sign may be omitted from large, line-type utility vehicles if it is impractical to mount the sign.

Figure 10.2: Continuously Slow-Moving Work – Two-Lane, Two-Way Roadway



10.3 Intermittently-Moving Work – Two-Lane, Two-Way Roadway

Purpose:

Intermittently-moving work is a maintenance activity for which the work zone changes frequently or a work operation that involves frequent short stops not exceeding 30 minutes in duration.

Examples include:

- group relamping of street lights
- multiple pothole patching (several stops within 1 km)
- traffic control device placement and/or removal
- crack sealing
- sign cleaning
- catch basin flushing
- station measurement
- litter bag pick-up
- raised pavement marker installation

Standard:

- Work and shadow vehicles shall display Yield to Oncoming Traffic R-56-1 signs.
- The shadow vehicle shall display a rear-mounted Caution This Truck Stops Frequently C-039 sign.
- A Truck Stopped on Road Next 2 km C-038 sign is required, and it shall be moved as the work progresses so that the work vehicle remains within the distance indicated on the sign.

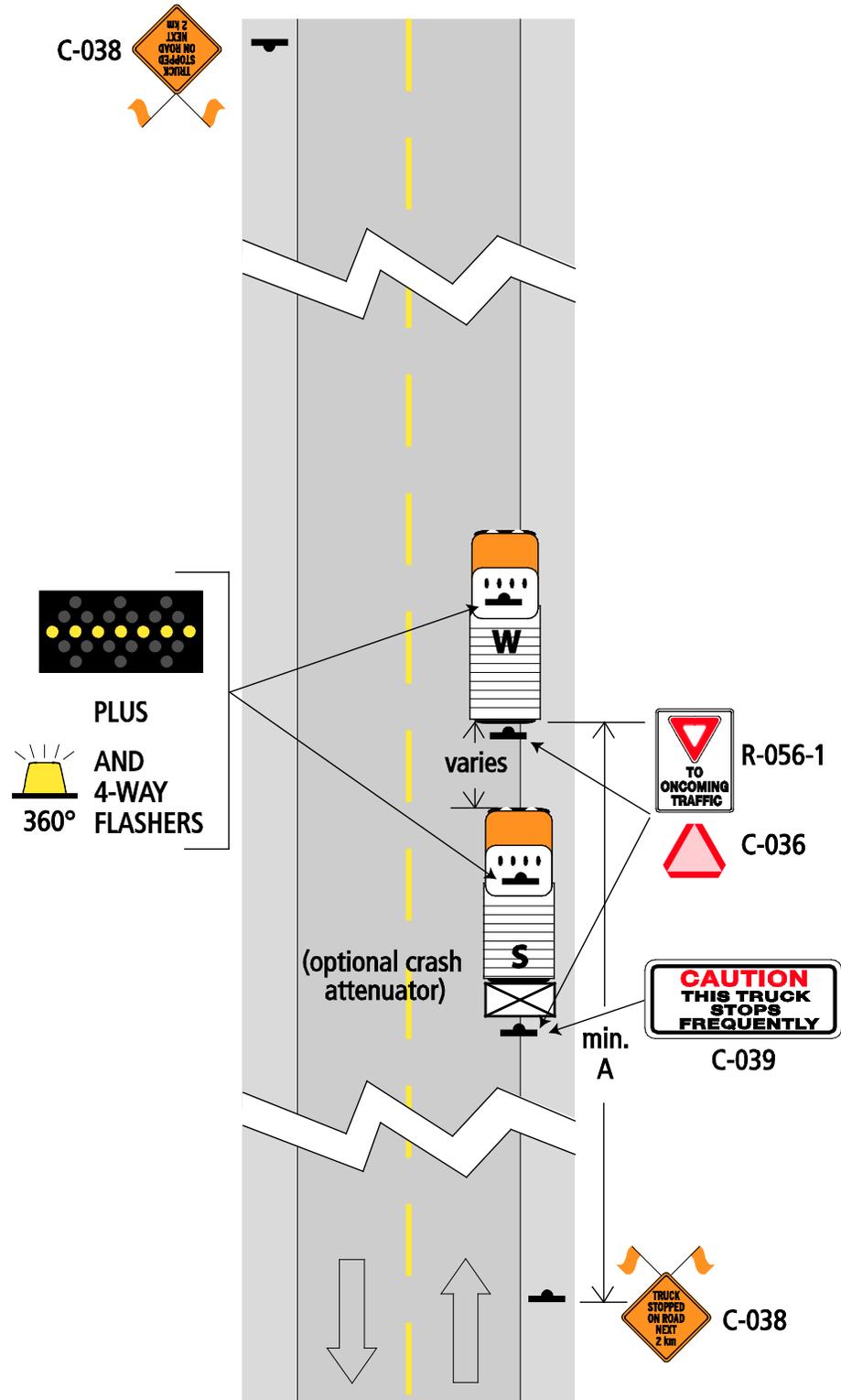
Guidance:

- The shadow vehicle should keep as far right as practicable—or as far left as practicable if working in the left lane—but may encroach into the travel lane when the shoulder is too narrow to drive on.
- Work vehicles may resume travelling at posted speeds when work stops.

Options:

- A shadow vehicle may not be required for work that typically occurs off the roadway on the shoulder (e.g., litter bag pick-up or sign-cleaning activities).
- If the construction speed limit is ≤ 60 km/h:
 - Where an advance Truck Stopped on Road Next 2 km C-038 sign is used, using a shadow vehicle is optional.
 - For low-volume roadways, the Truck Stopped on Road Next 2 km C-038 sign and/or a shadow vehicle and its accessories may be omitted.
 - The flashing arrow board (FAB) on the work vehicle may be omitted, but the double-sided Prepare to Stop C-040D sign must be used in its place. The 360-degree light and 4-way flashers are always required
- An arrow stick or a shadow vehicle may be substituted for the flashing arrow board (FAB) on large, line-type utility vehicles if it is impractical to mount the FAB.

Figure 10.3: Intermittently-Moving Work – Two-Lane, Two-Way Roadway



10.4 Continuously Slow-Moving Work – Multilane Undivided or Divided Roadway

Purpose:

Continuously slow-moving work is done while continuously moving at slow speeds. These operations normally do not involve stopping, but infrequent stops of up to 15 minutes may occur.

Examples include:

- grading/shouldering
- concrete barrier flushing
- hydro-seeding
- mowing
- dust control
- sweeping

For pavement marking layouts (i.e., intersection marking and quick-dry pavement marking), see [Section 14: Traffic Control Layouts – Pavement Marking](#).

Standard:

- Shadow vehicles shall display a Slow Vehicle(s) Ahead C-045-X sign.
- At least one shadow vehicle shall be used for undivided roadways.
- Two shadow vehicles shall be used for divided roadways.
- Slow Vehicle Next X km C-044 signs shall be used, and they shall be moved as the work progresses so that the work vehicle remains within the distance indicated on the signs.

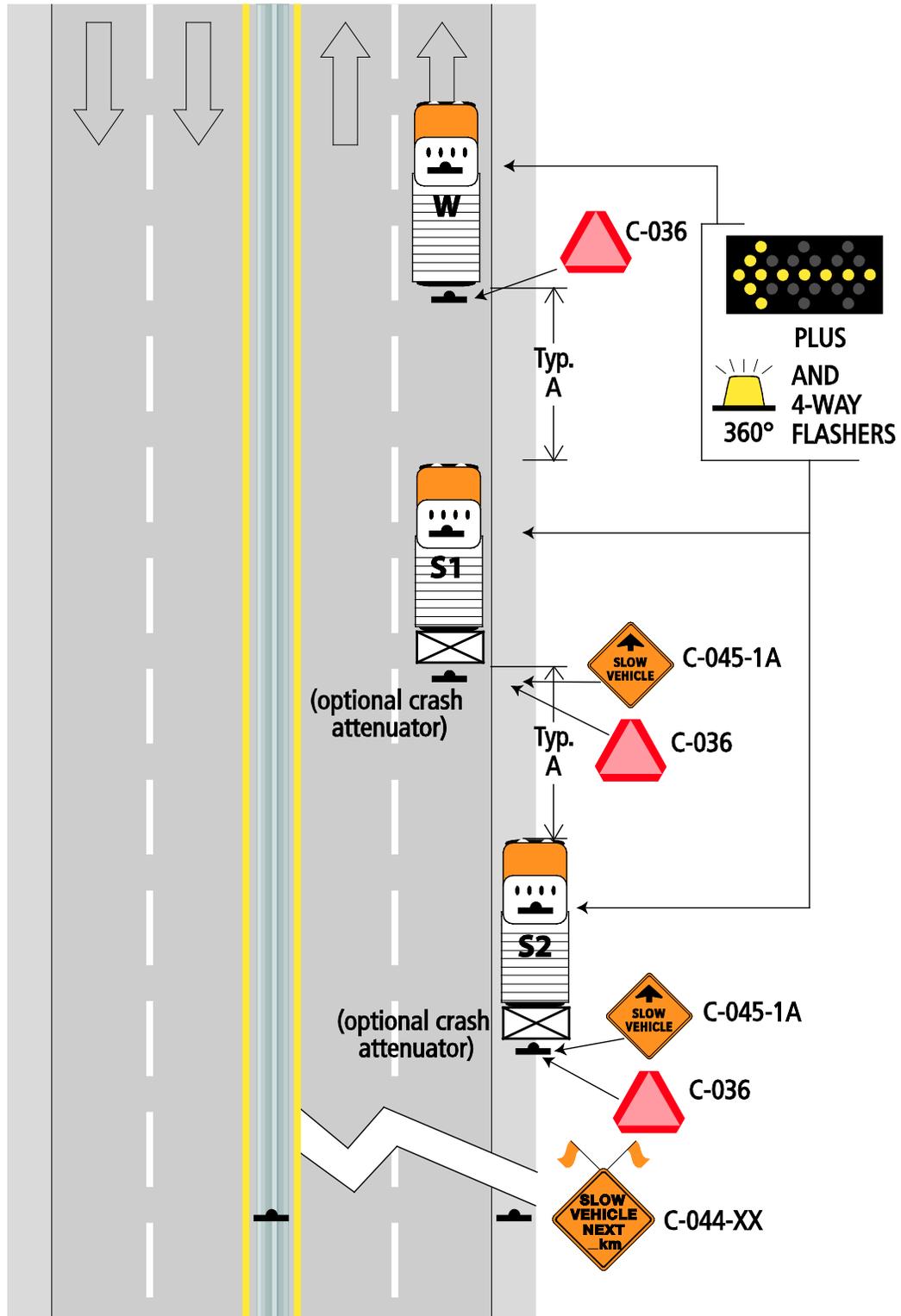
Guidance:

- The distance on the Slow Vehicle Next X km C-044 signs should not exceed 8 kilometres.
- Typical spacing between the shadow vehicle and the work vehicle is Table B Distance A.
- For divided roadways, the shadow vehicle should keep as far right as practicable—or as far left as practicable if working in the left lane—but may encroach into the travel lane when the shoulder is too narrow to drive on.
- The space between the shadow vehicle and the work vehicle may be adjusted as follows:
 - decreased in areas with heavy traffic to deter road users from driving between the two vehicles
 - increased to provide adequate sight distance for vehicles approaching from the rear

Options:

- If the speed limit is ≤ 60 km/h:
 - Where a Slow Vehicle Next X km C-044 sign is used, using one less shadow vehicle is optional.
 - The flashing arrow board (FAB) on the work vehicle may be omitted but the 360-degree flashing light and 4-way flashers are always required.

Figure 10.4: Continuously Slow-Moving Work – Multilane Undivided or Divided Roadway



10.5 Intermittently-Moving Work – Multilane Undivided or Divided Roadway

Purpose:

Intermittently-moving work is a maintenance activity for which the work zone changes frequently or a work operation that involves frequent short stops not exceeding 30 minutes in duration.

Examples include:

- group relamping of street lights
- multiple pothole patching (several stops within 1 km)
- traffic control device placement and/or removal
- crack sealing
- sign cleaning
- catch basin flushing
- station measurement
- litter bag pick-up
- pavement marker installation

Standard:

- Work vehicles shall display rear-mounted Slow Moving Vehicle C-036 signs and Caution This Truck Stops Frequently C-039 signs.
- Shadow vehicle shall display rear-mounted Slow Moving Vehicle C-036 signs and Slow Vehicle(s) Ahead C-045-X signs.
- At least one shadow vehicle shall be used for undivided roadways.
- Two shadow vehicles shall be used for divided roadways.
- A Truck Stopped on Road Next 2 km C-038 sign is required, and it shall be moved as the work progresses so that the work vehicle remains within the distance indicated on the sign.

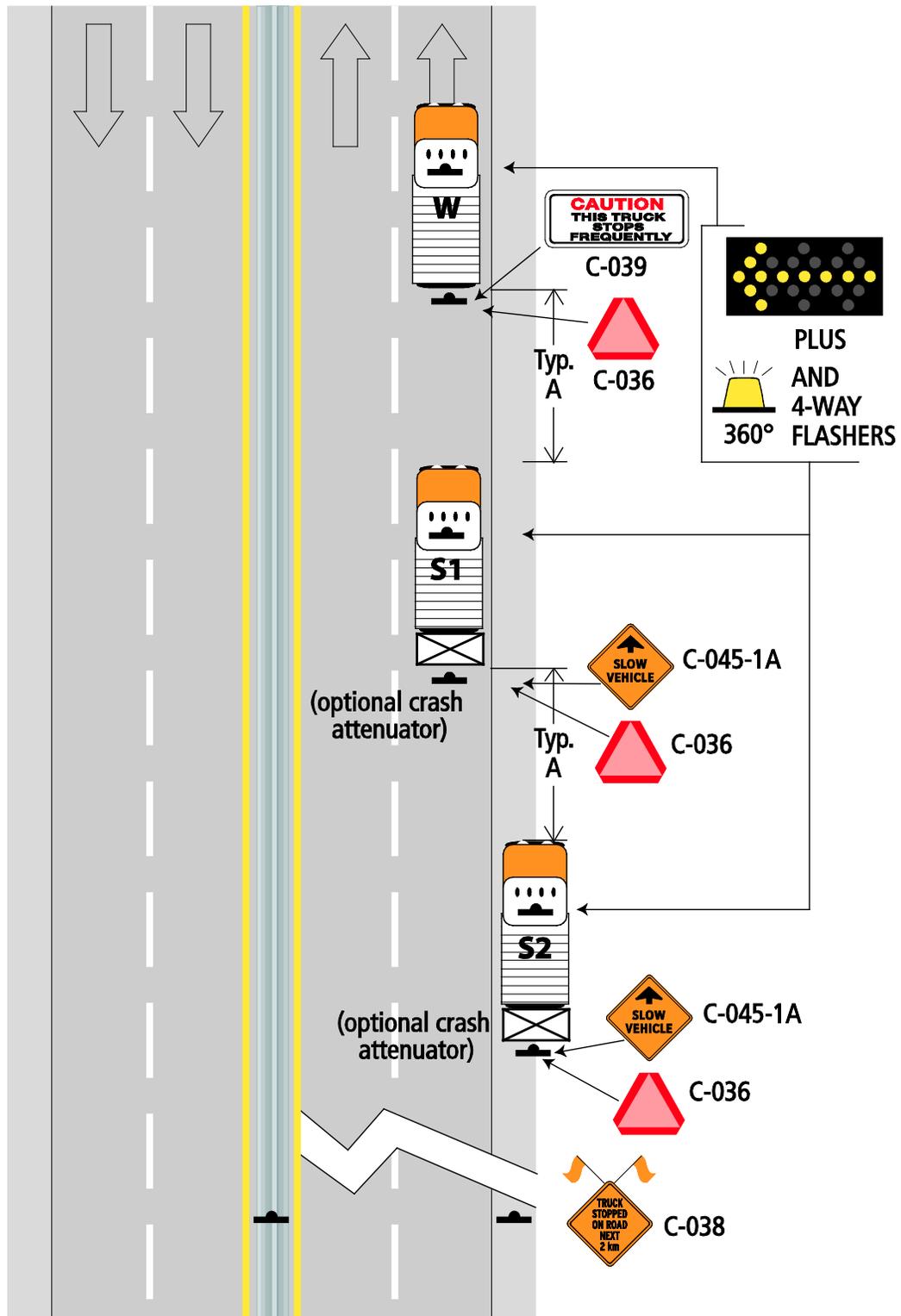
Guidance:

- For divided roadways, the shadow vehicle should keep as far right as practicable—or as far left as practicable if working in the left lane—but may encroach into the travel lane when the shoulder is too narrow to drive on.
- Typical spacing between the shadow vehicle and the work vehicle is Table B Distance A.
- The space between the shadow vehicle and the work vehicle may be adjusted as follows:
 - decreased in areas with heavy traffic to deter road users from driving between the two vehicles
 - increased to provide adequate sight distance for vehicles approaching from the rear

Options:

- If the speed limit is ≤ 60 km/h and if two shadow vehicles are used:
 - Where a Truck Stopped on Road Next 2 km C-038 sign is used, using one less shadow vehicle is optional.
 - The flashing arrow board (FAB) on the work vehicle may be omitted but the 360-degree flashing light and 4-way flashers are always required.

Figure 10.5: Intermittently-Moving Work – Multilane Undivided or Divided Roadway



10.6 Rolling Slowdown

Purpose:

A rolling slowdown uses shadow vehicles to protect moving work in the travel lanes, and can be implemented only on a multilane roadway on which passing over the centreline is not permitted.

The shadow vehicles form a moving blockade across all lanes, thereby reducing traffic speeds and creating a large gap in traffic—a clear area in which work can be accomplished without completely stopping the traffic.

This setup is typically used in circumstance where a full road closure would otherwise be required for short-duration work operations, and for which implementing traffic control measures would take more time than the actual work (e.g., a film company taking a scenic shot along a roadway).

Using this type of setup is resource-intensive and requires consultation with the Road Authority before it can be initiated.

Standard:

- All ramps and entrances to the roadway between the moving blockade and the work operation shall be temporarily closed using a shadow vehicle.
- Each of those ramps shall remain closed until the crew doing the work gives the “all clear” signal or until the front of the moving blockade passes the closed on-ramps and entrances.
- At least one shadow vehicle shall be used in each lane,
- The shadow vehicles blocking traffic shall enter the roadway far enough upstream from the work area to allow a clear area to develop in front of them.
- The shadow vehicles shall move into position so that they form a moving blockade across the travel lanes.
- A separate chase vehicle with a 360-degree flashing light and 4-way flashers shall follow the last public vehicle ahead of the blockade, travelling in front of the moving blockade of shadow vehicles.
- As the blockade slows down, it creates the work area between the blockade and the chase vehicle.
- Communications shall be maintained between the work crew and the moving blockade so that the speed of the blockade can be adjusted to increase or decrease the closure time if necessary.
- Traffic can be released only after all workers and their vehicles have been confirmed to be clear of the roadway.

To calculate the distance upstream of the work area at which to start the slowdown:

A long enough gap in traffic shall be created for traffic moving at a fixed, reduced speed to provide the estimated time needed for the work to be done.

Rolling Slowdown Calculations:

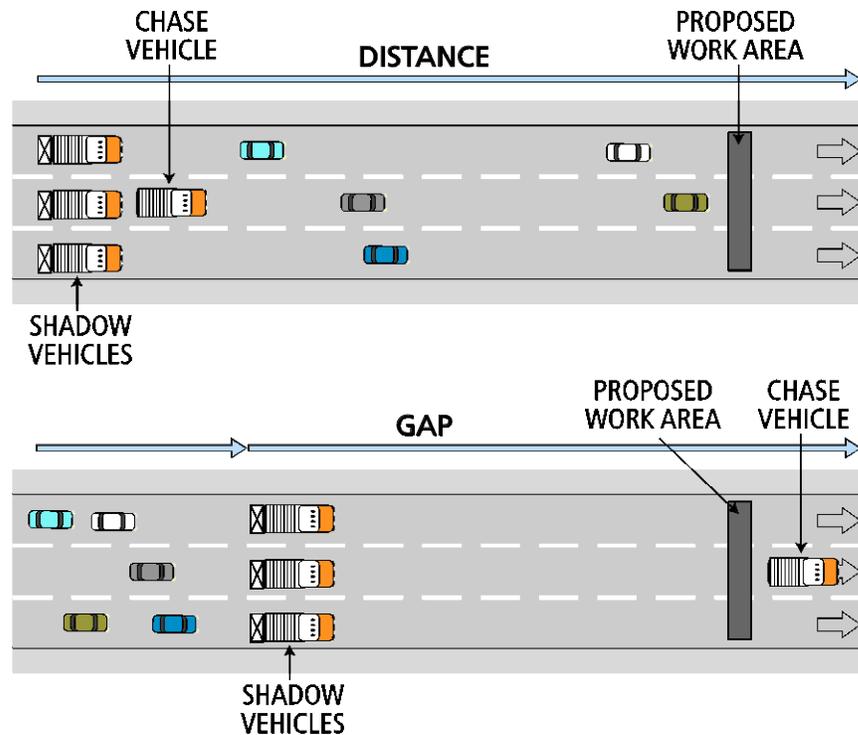
Known:

- T = Time needed with no traffic (in minutes).
- Vs = Speed of slowdown vehicles (in km/h). A minimum 30 km/h speed limit is recommended.
- Vc = Speed of chase vehicle in front of slowdown (in km/h). It should generally be the posted speed limit.

Calculations:

- G = Gap needed (in km).
- G = $T (Vs/60)$
- C = Clearance time needed to create the required gap (in minutes).
- C = $G / (Vc/60 - Vs/60)$
- D = Distance ahead of the work area at which to start the slowdown (in km).

Example:



continued →

Calculations (continued):

A 5-minute gap is required on a 100 km/h freeway to move a large piece of equipment across the roadway and into the median work area, so a 30 km/h rolling slowdown is proposed during the off-peak or lowest traffic volume hours for the freeway.

$$G = 5 (30/60) = 2.5 \text{ km}$$

$$C = 2.5 / (100/60 - 30/60) = 2.9 \text{ minutes}$$

D = Distance ahead of the work area at which to start the slowdown (in km).

$$D = 2.9 (100/60) = 4.9 \text{ km}$$

Guidance:

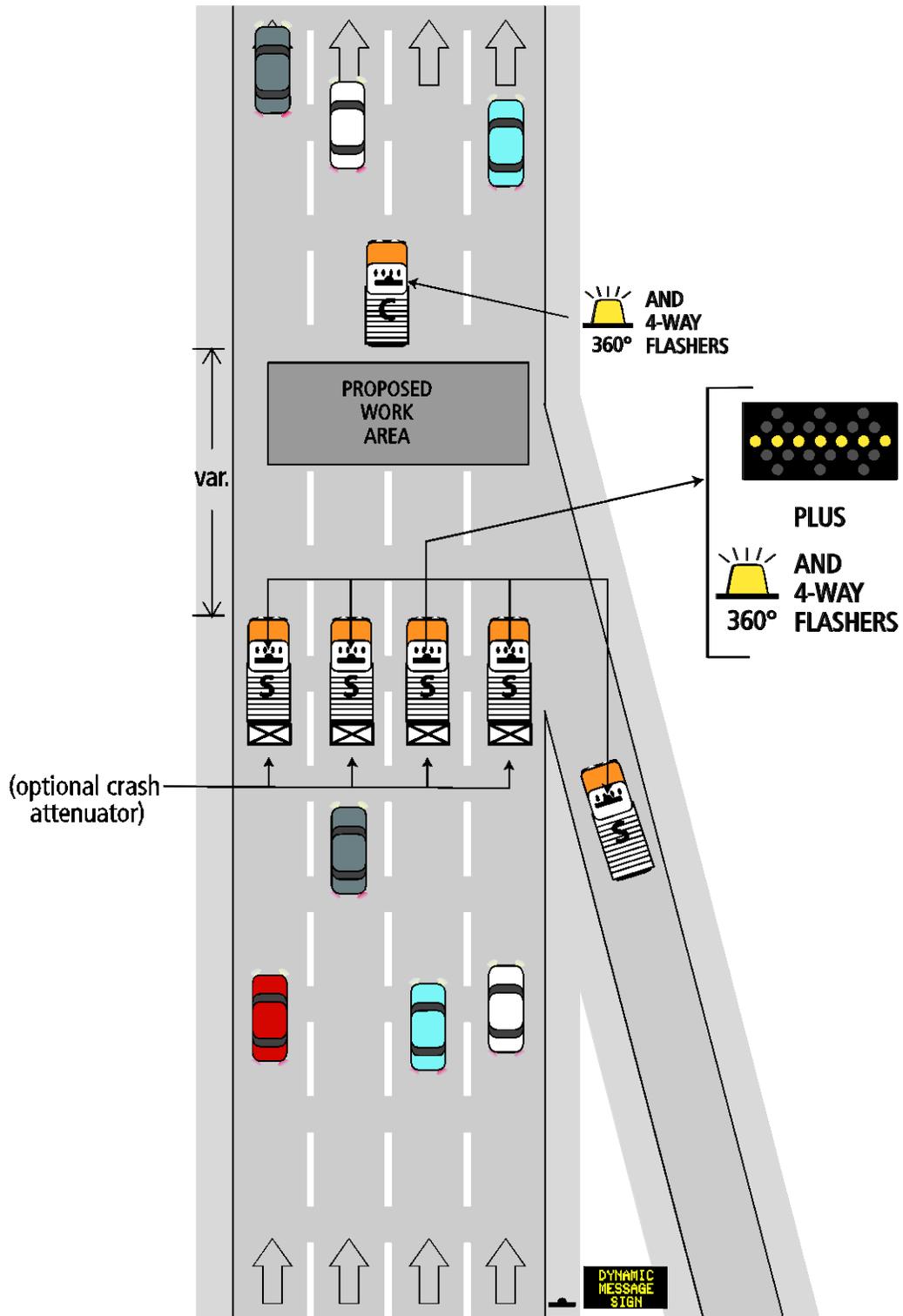
- The shadow vehicles in the rolling slowdown should travel on the lane lines.

Options:

- A truck-mounted dynamic message sign (DMS) may be used to display this message:

Slow or Stopped Vehicles Ahead

Figure 10.6: Rolling Slowdown



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PART B – TRAFFIC CONTROL

Section 11: Traffic Control Layouts – Intersections¹

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¹ See [Section 12: Traffic Control Layouts – Roundabouts](#) for information on traffic control layouts for roundabouts.

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PART B – TRAFFIC CONTROL

Section 11: Traffic Control Layouts – Intersections

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

11.1 General Information - Intersections¹

1. Traffic control within an intersection requires careful consideration of all the approaches and accesses, the nature of adjacent land uses, and the intersection control type.
2. To control each leg of an intersection, multiple Traffic Control Persons are typically required.
3. Signalized intersections typically exist on high-volume corridors that may experience peak traffic periods. This shall be considered when determining the appropriate traffic control for the project. If excessive queues develop, traffic control should be removed as soon as possible to restore normal traffic operations.
4. Within a signalized intersection, the direction provided by Traffic Control Persons cannot conflict with the direction provided by the signal heads so the signal shall be either turned off or bagged.
5. Good communication between the Traffic Control Persons who are operating an intersection helps to maintain reasonable delay periods on each approach and ensures that multiple traffic streams are not simultaneously given conflicting right-of-way through the intersection.
6. Careful consideration should also be given to other road users, such as pedestrians and cyclists, to ensure that they can negotiate through the intersection satisfactorily. This may require the use of additional Traffic Control Persons who are dedicated to serving pedestrian demand.

¹ See [Section 12: Traffic Control Layouts – Roundabouts](#) for information on traffic control layouts for roundabouts.

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign shall be used.
- For long-duration work, a Construction Ahead C-018-1A sign shall be used.
- Traffic Control Person Ahead C-001-1 signs shall be used in advance of TCPs.
- On undivided roadways, barricades are required at each end of the work activity area for long-duration work. They are required on the approach side only for divided roadways.
- Where the speed limit is ≥ 70 km/h, a buffer space shall be used.
- All work, buffer, and shadow vehicles shall be equipped with a 360-degree flashing light and 4-way flashers.

Guidance:

- Where the speed limit is ≥ 70 km/h a buffer vehicle should be used when workers are present.
- A vehicle-mounted crash attenuator is recommended for use on buffer vehicles.
- When a detour is not implemented, to maintain traffic flow, it may be necessary to restrict turning movements at the intersection (i.e., prohibit left and/or right turns using Turn Control R-015-L/R signs).

Options:

- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic
- A portable dynamic message sign (DMS) may be used to provide advance messaging for drivers.
- When traffic volumes are high or the intersection is signalized, consult the Road Authority.
- In low speed (≤ 60 km/h) urban areas (within municipal boundaries), customization of traffic control layouts, including closer device spacing and shorter taper lengths, may be necessary to maintain access and mobility. In these cases, document why adjustments are being made.

11.2 Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCPs (Near Side) – Short and Long Duration

Purpose:

This layout shows the typical setup for a lane closure using Traffic Control Persons on a two-lane, two-way roadway when the closure is on the approach to (near side of) an intersection. It may be used where the intersection is signalized or stop-controlled.

One TCP is typically needed for each leg of the intersection because traffic control is complex at intersections, especially for turning traffic.

Standard:

- Single Lane Traffic C-030-8 signs are required in both directions along the roadway where the work is being conducted.
- A Prepare to Stop C-029 sign shall be placed on the cross street in advance of the intersection.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.

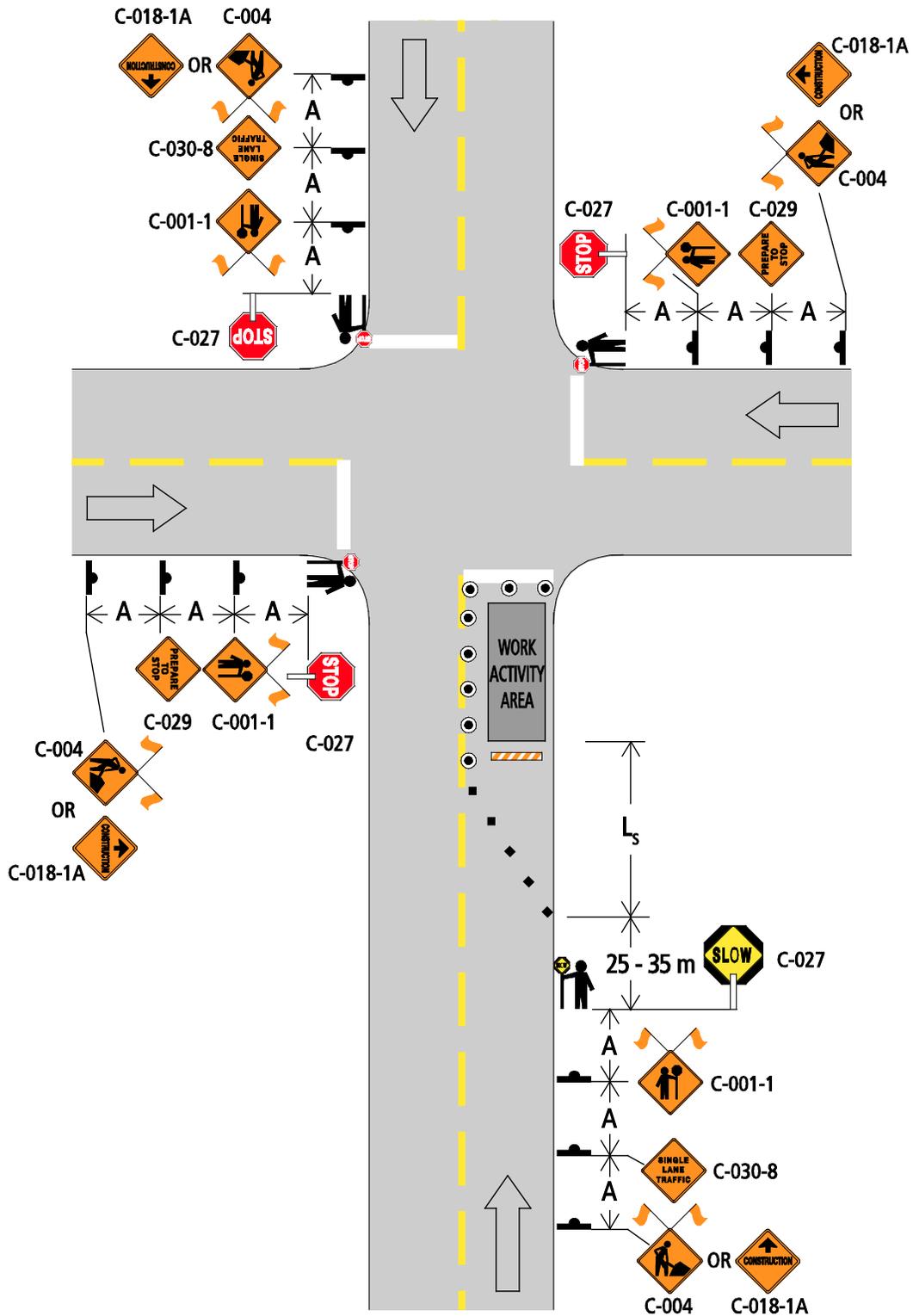
Guidance:

- None at this time.

Options:

- Where approach speeds are ≤ 60 km/h, cones may be used instead of tubular markers.
- If the cross street volume is low, TCPs may not be required in the cross direction but Traffic Control Person Ahead C-001-1 signs are still required to identify the presence of other TCPs controlling traffic.

Figure 11.2: Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCPs (Near Side) – Short and Long Duration



11.3 Intersection Lane Closure – Two-Lane, Two-Way Roadway with Detour (Near Side) – Short and Long Duration

Purpose:

This layout shows the typical setup for a lane closure on a two-lane, two-way roadway when the closure occurs on the approach to (near side of) an intersection. It may be used where a detour can be established to allow drivers to bypass the closed area. Detour signage is continued at decision points through the detour route to guide motorists along the detour and back to the main roadway.

This layout is to be used only if a detour route is available.

If no alternative route is available, TCPs are required as shown in [Section 11.2: Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCPs \(Near Side\)](#).

Standard:

- Either a Road Closed Ahead C-030-6A sign or a dynamic message sign (DMS) shall be the first sign used on the approach to the closed portion of roadway.
- A Detour Ahead Left/Right C-006-L/R marker shall be used in advance of the detour route to guide traffic in the appropriate direction.
- A Turn Control R-015-L/R sign shall be used on the cross street to restrict traffic from turning into the work area.
- Barricades on the closed lane shall display to approaching traffic a Road Closed R-012 sign and a Detour C-005-L/R sign.

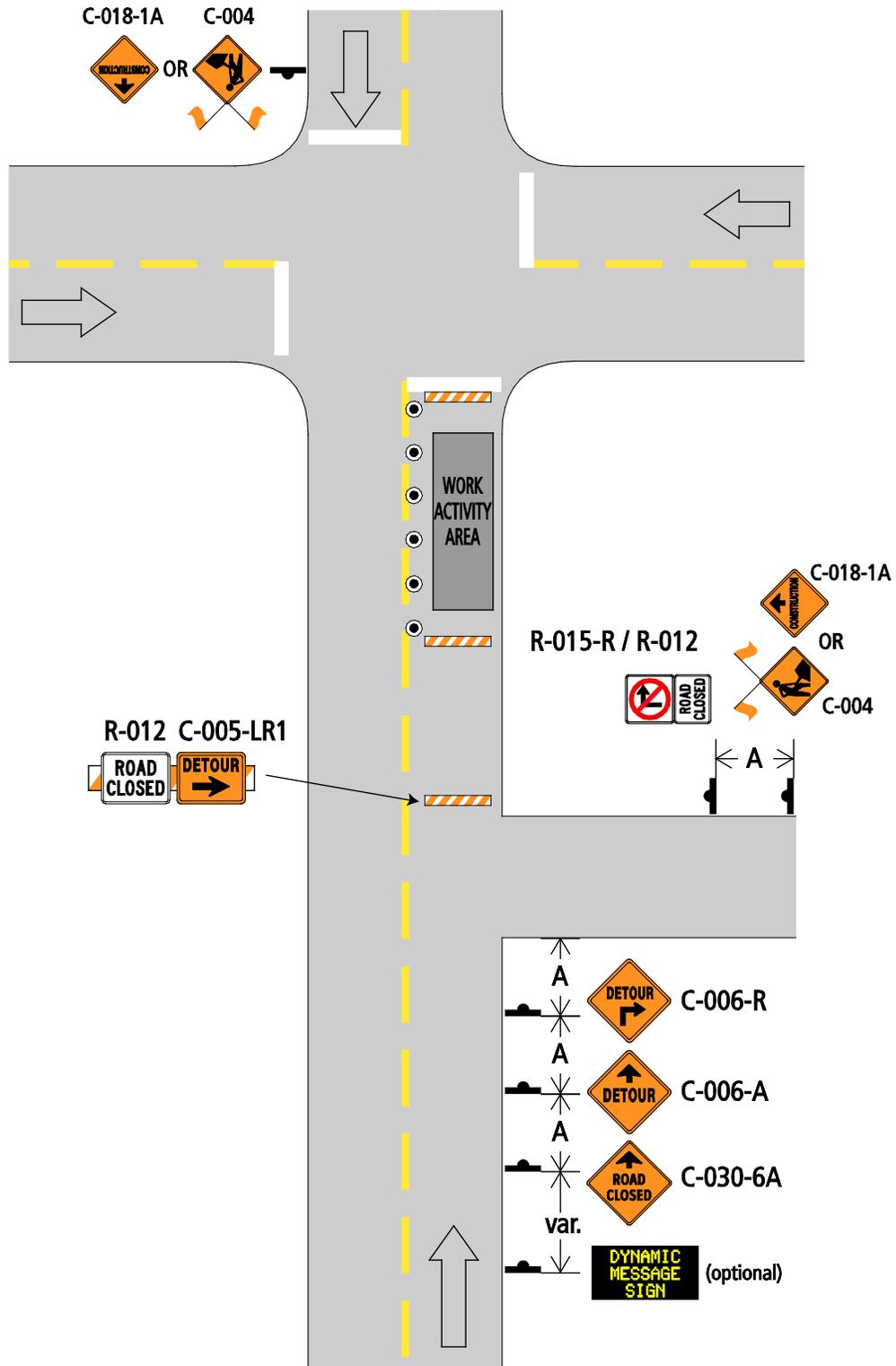
Guidance:

- Advance planning is recommended for situations involving business access and egress.
- The detour route chosen should have the least impact on the travelling public and local residents. This may necessitate establishing the detour on a road further in advance of the work area.

Options:

- Flashing arrow boards (FABs) may be used in addition to barricades. They should be set to caution mode to mark the closed portion of the roadway, and to arrow mode at the detour.

Figure 11.3: Intersection Lane Closure – Two-Lane, Two-Way Roadway with Detour (Near Side) – Short and Long Duration



11.4 Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCP's (Far Side) – Short and Long Duration

Purpose:

This layout shows the typical setup for a lane closure using Traffic Control Persons on a two-lane, two-way roadway when the closure occurs downstream (far side) of an intersection. It may be used where the intersection is signalized or stop-controlled.

One TCP is typically needed for each leg of the intersection because traffic control is complex at intersections, especially for turning traffic.

Standard:

- Single Lane Traffic C-030-8 signs are required in both directions along the roadway where the work is being conducted.
- A Prepare to Stop C-029 sign shall be placed on the cross street in advance of the intersection.
- A flashing arrow board (FAB) in caution mode shall be placed inside the approaching taper in advance of the work area.
- Tubular markers are required for channelizing traffic and for tapers.
- When TCPs are directing traffic, the construction speed limit shall not be greater than 70 km/h.

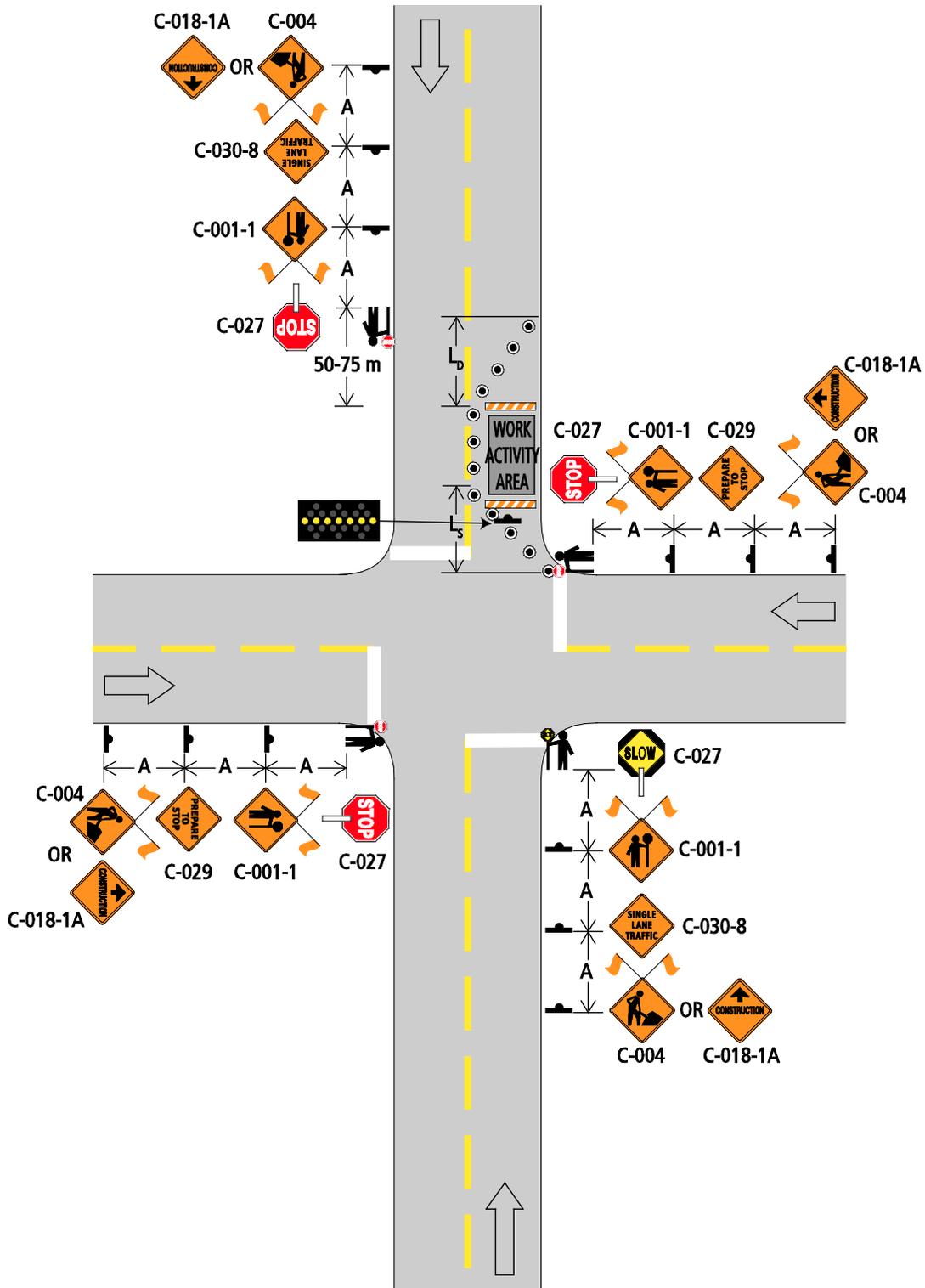
Guidance:

- None at this time.

Options:

- Where approach speeds are ≤ 60 km/h, cones may be used instead of tubular markers.
- If the speed of the roadway on which the work is being undertaken is ≤ 60 km/h, the flashing arrow board (FAB) may be replaced by a barricade with a flashing light.
- If the cross-street volume is low, TCPs may not be required in the cross direction but Traffic Control Person Ahead C-001-1 signs are still required to identify the presence of other TCPs directing traffic.

Figure 11.4: Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCPs (Far Side) – Short and Long Duration



11.5 Intersection Lane Closure – Two-Lane, Two-Way Roadway with Detour (Far Side) – Short and Long Duration

Purpose:

This layout shows the typical setup for a lane closure on a two-lane, two-way roadway when the closure occurs downstream (far side) of an intersection. It may be used where a detour can be established to allow drivers to bypass the closed area. Detour signage is continued at decision points through the detour route to guide motorists along the detour and back to the main roadway.

This layout is to be used only if a detour route is available.

If no alternative route is available, TCPs are required as shown in [Section 11.4: Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCPs \(Far Side\)](#).

Standard:

- Either a Road Closed Ahead C-030-6A sign or a dynamic message sign (DMS) shall be the first sign used on the approach to the closed portion of roadway.
- A Detour Ahead Left/Right C-006-L/R sign shall be used in advance of the detour route to guide traffic in the appropriate direction.
- A Turn Control R-015-L/R sign shall be used on the cross street to restrict traffic from turning into the work area.
- Tubular markers are required for channelizing traffic and for tapers.
- A flashing arrow board (FAB) in caution mode shall be used in advance of the work area.

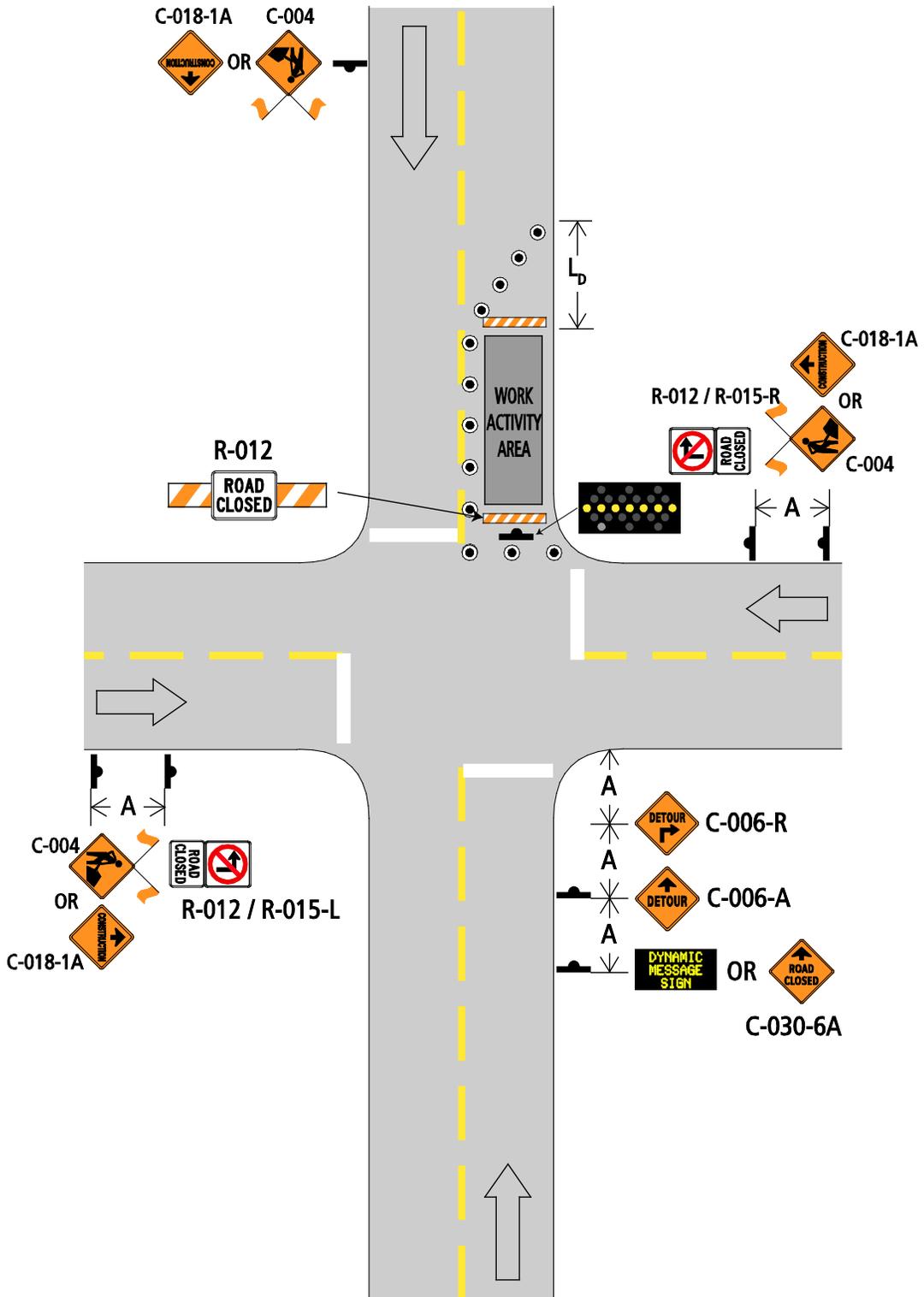
Guidance:

- Advance planning is recommended for situations involving business access and egress.
- The detour route chosen should have the least impact on the travelling public and local residents. This may necessitate establishing the detour on a road further in advance of the work area.

Options:

- Where approach speeds are ≤ 60 km/h, cones may be used instead of tubular markers.
- If the speed of the roadway on which the work is being undertaken is ≤ 60 km/h, the flashing arrow board (FAB) on the approach side of the work activity area may be replaced by a barricade with a Road Closed R-012 sign.

Figure 11.5: Intersection Lane Closure – Two-Lane, Two-Way Roadway with Detour (Far Side) – Short and Long Duration



11.6 Right Lane Closure (Near Side) – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure on a multilane roadway when the closure occurs on the approach to (near side of) an intersection. It may be used where the intersection is signalized or stop-controlled.

Since at least one lane is available approaching the intersection in the affected direction, traffic is diverted into an adjacent lane through a lane drop.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab is required in advance of a second Right Lane Closed Ahead C-130-R sign.
- A flashing arrow board (FAB) in arrow mode shall be placed inside the approaching taper in advance of the work area.

Guidance:

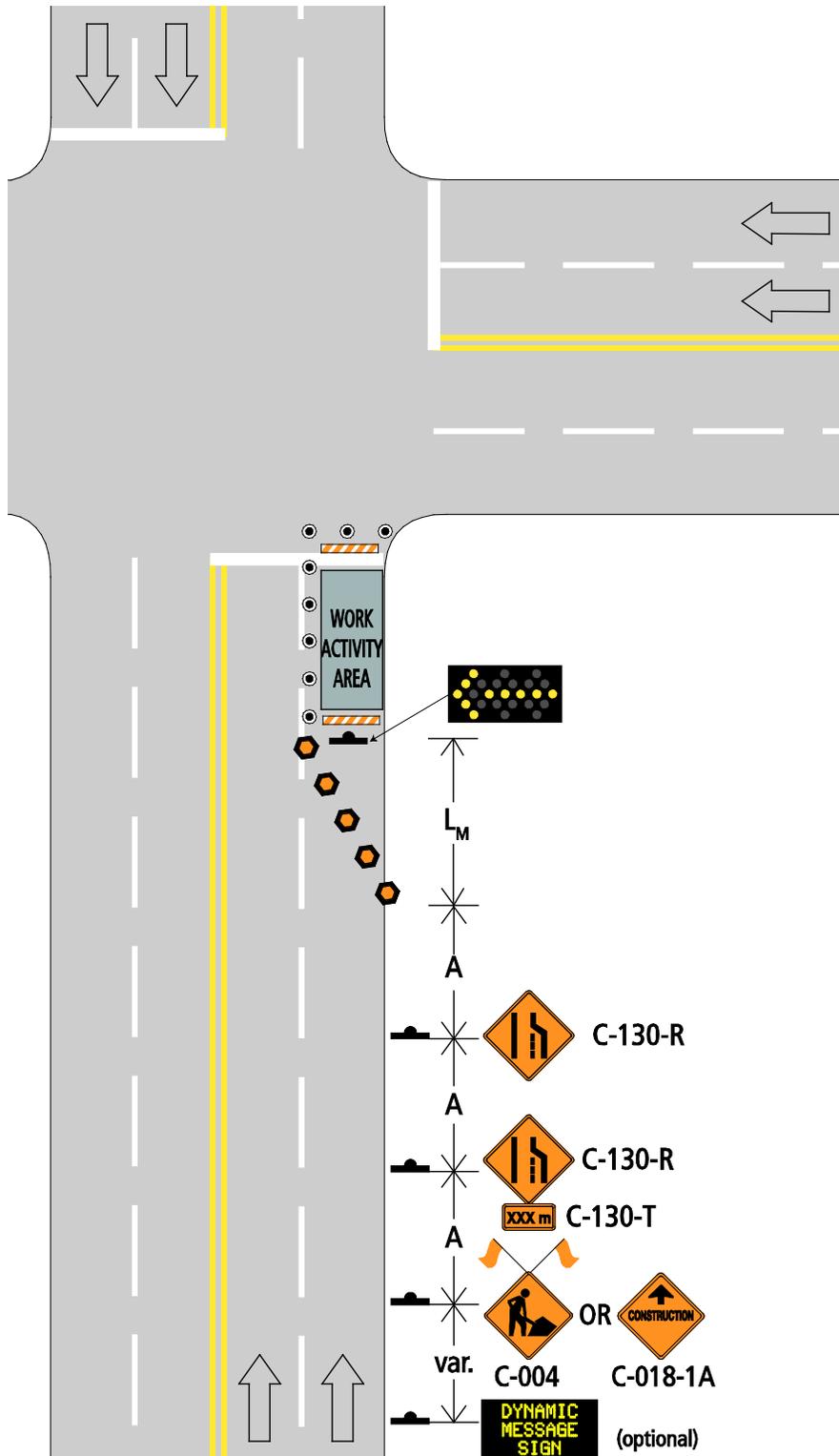
- Median-mounted signs matching the shoulder-mounted signs should be used where space allows.

Options:

- A dynamic message sign (DMS) may be used in advance of the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign.
- If the speed limit is ≤ 60 km/h:
 - The upstream Right Lane Closed C-130-R sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
 - Cones may be used for protecting the work area.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 11.6: Right Lane Closure (Near Side) – Multilane Intersection – Short and Long Duration



11.7 Left Lane Closure (Far Side) – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure on a multilane roadway when the closure occurs downstream (far side) of an intersection. It may be used where the intersection is signalized or stop-controlled.

Since at least one lane is available approaching the intersection in the affected direction, traffic is diverted into an adjacent lane through a lane drop. Although the work is taking place downstream of the intersection, the lane drop should be established in advance of the intersection.

Standard:

- The left lane shall be closed on the near side of the intersection and traffic moved to the right lane.
- A Left Lane Closed Ahead C-130-L sign with a C-130-T distance tab is required in advance of a second Left Lane Closed Ahead C-130-L sign.
- A flashing arrow board (FAB) in arrow mode shall be placed inside the taper in advance of the work area on the near side of the intersection.
- A Lane Closure Arrow C-053 sign and barricade shall be positioned immediately in advance of the work area on the far side of the intersection.

Guidance:

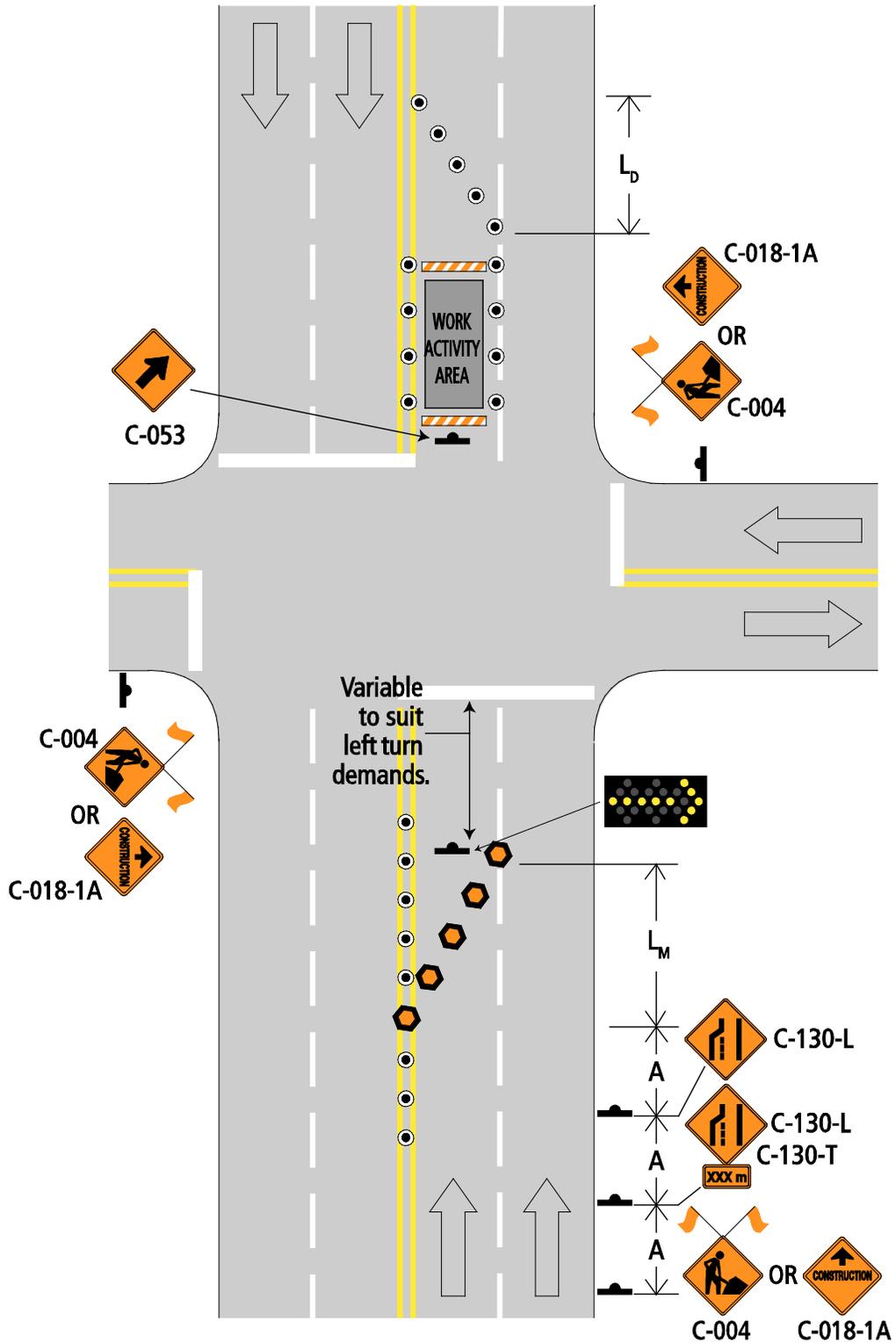
- A left lane that has significant left-turning movements may remain open as a turn lane for left turns only. Sufficient space should be considered for vehicle storage in this lane, and additional traffic control should be considered.
- Median-mounted signs matching the shoulder-mounted signs should be used where space allows.

Options:

- If the speed limit is ≤ 60 km/h:
 - The upstream Left Lane Closed Ahead C-130-L sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 11.7: Left Lane Closure (Far Side) – Multilane Intersection – Short and Long Duration



11.8 Right Lane Closure (Far Side) – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure on a multilane roadway when the closure occurs downstream (far side) of an intersection. It may be used where the intersection is signalized or stop-controlled.

Since at least one lane is available approaching the intersection in the affected direction, traffic is diverted into an adjacent lane through a lane drop. Although the work is taking place downstream of the intersection, the lane drop should be established in advance of the intersection.

Standard:

- The right lane shall be closed on the near side of the intersection and traffic moved to the left lane.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab is required in advance of a second Right Lane Closed Ahead C-130-R sign.
- A flashing arrow board (FAB) in arrow mode shall be placed inside the taper in advance of the work area on the near side of the intersection.
- A Lane Closure Arrow C-053 sign and barricade shall be used immediately in advance of the work area on the far side.

Guidance:

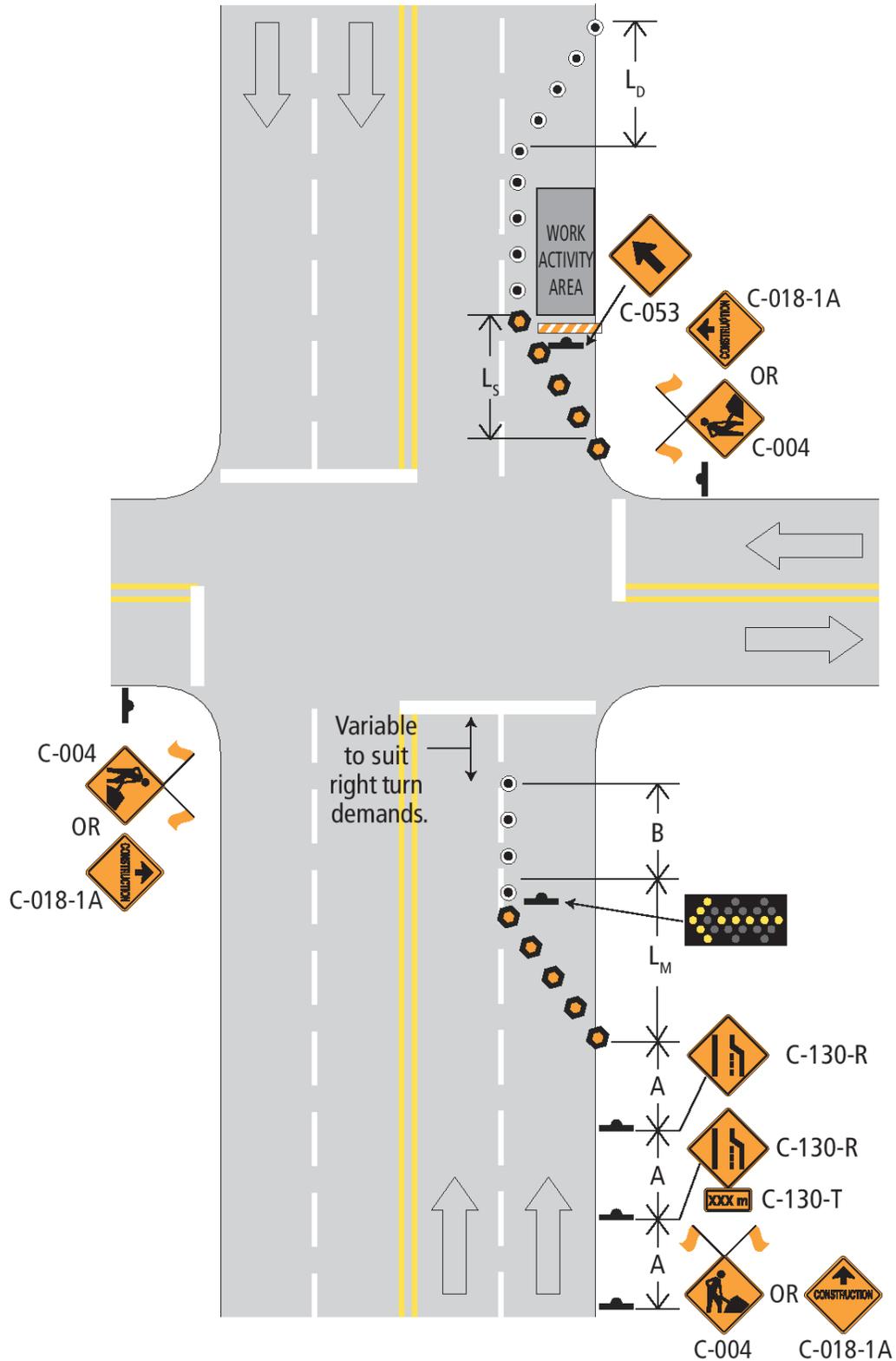
- A right lane that has significant right-turning movements may remain open as a turn lane for right turns only. Sufficient space should be considered for vehicle storage in this lane, and additional traffic control should be considered.
- Median-mounted signs matching the shoulder-mounted signs should be used where space allows.

Options:

- If the speed limit is ≤ 60 km/h:
 - The upstream Right Lane Closed Ahead C-130-R sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 11.8: Right Lane Closure (Far Side) – Multilane Intersection – Short and Long Duration



11.9 Left/Right Lane Closure within Intersection – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure on a multilane roadway where the closure extends into—and possibly through—an intersection that affects both major road and cross-direction traffic. It may be used where the intersection is signalized or stop-controlled.

Traffic from the closed lane on the major road is diverted into an adjacent lane using a lane drop. Traffic on the cross street should be informed of the partial or complete closure, and re-routed using a detour route if possible.

Because of the lane closure within the intersection, it is necessary to restrict turning movements at the intersection for certain directions of travel (i.e., prohibit left and/or right turns by using Turn Control R-015-L/R signs).

Standard:

- On the **major road**:
 - The left/right lane shall be closed on the near side of the intersection, and traffic moved to the left/right lane.
 - A Left/Right Lane Closed Ahead C-130-L/R sign with a C-130-T distance tab is required in advance of a second Left/Right Lane Closed Ahead C-130-L/R sign.
 - A Road Closed R-012 sign and a Turn Control R-015-L/R sign shall be placed in advance of the work area and repeated closer to the intersection.
 - In the opposing direction on the major road, a Road Closed R-012 sign and a Turn Control R-015-L/R sign shall be used.
 - A flashing arrow board (FAB) in arrow mode shall be placed inside the taper in advance of the work area on the near side of the intersection.
- In the **cross-street direction**:
 - From both directions, a Road Closed Ahead C-030-6A sign or a dynamic message sign (DMS) shall be the first sign used on the approach to the closed portion of roadway.
 - Turning shall be restricted in the cross direction with a No Through Traffic R-017-2 sign and a Road Closed R-012 sign.
 - The closed lane shall be blocked by a barricade with a Road Closed R-012 sign and a Detour C-005-LR1 marker.
 - The barricade on the intersection side shall display a Road Closed R-012 sign.
- If a **detour route** is available, additional signage is required:
 - A Detour Ahead C-006-A marker shall be used in advance of the detour.
 - A Detour Ahead Left/Right C-006-LR marker shall be positioned just in advance of the detour route to guide traffic in the appropriate direction.

Guidance:

- Detour signing should be provided on both cross-street approaches wherever possible, and will vary with the detour routes available.

Options:

- If the speed limit is ≤ 60 km/h:
 - The upstream Left/Right Lane Closed Ahead C-130-L/R sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

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11.10 Right Lane Closure with Right-Turn Lane (Near Side) – Channelized Right Turn Open – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a single lane closure on a multilane roadway when the closure occurs on the approach to (near side of) an intersection.

It is typically be used at a signalized intersection where there is a channelized right-turn lane.

Traffic in the right lane is directed into the right-turn lane. Drivers in the right lane are informed in advance that traffic in the right lane must turn right.

Standard:

- A Right Lane Must Turn Right R-082-R2 sign with a C-130-T distance tab is required in advance of a second Right Lane Must Turn Right R-082-R2 sign.
- The flashing arrow board (FAB) shall be set to caution mode.

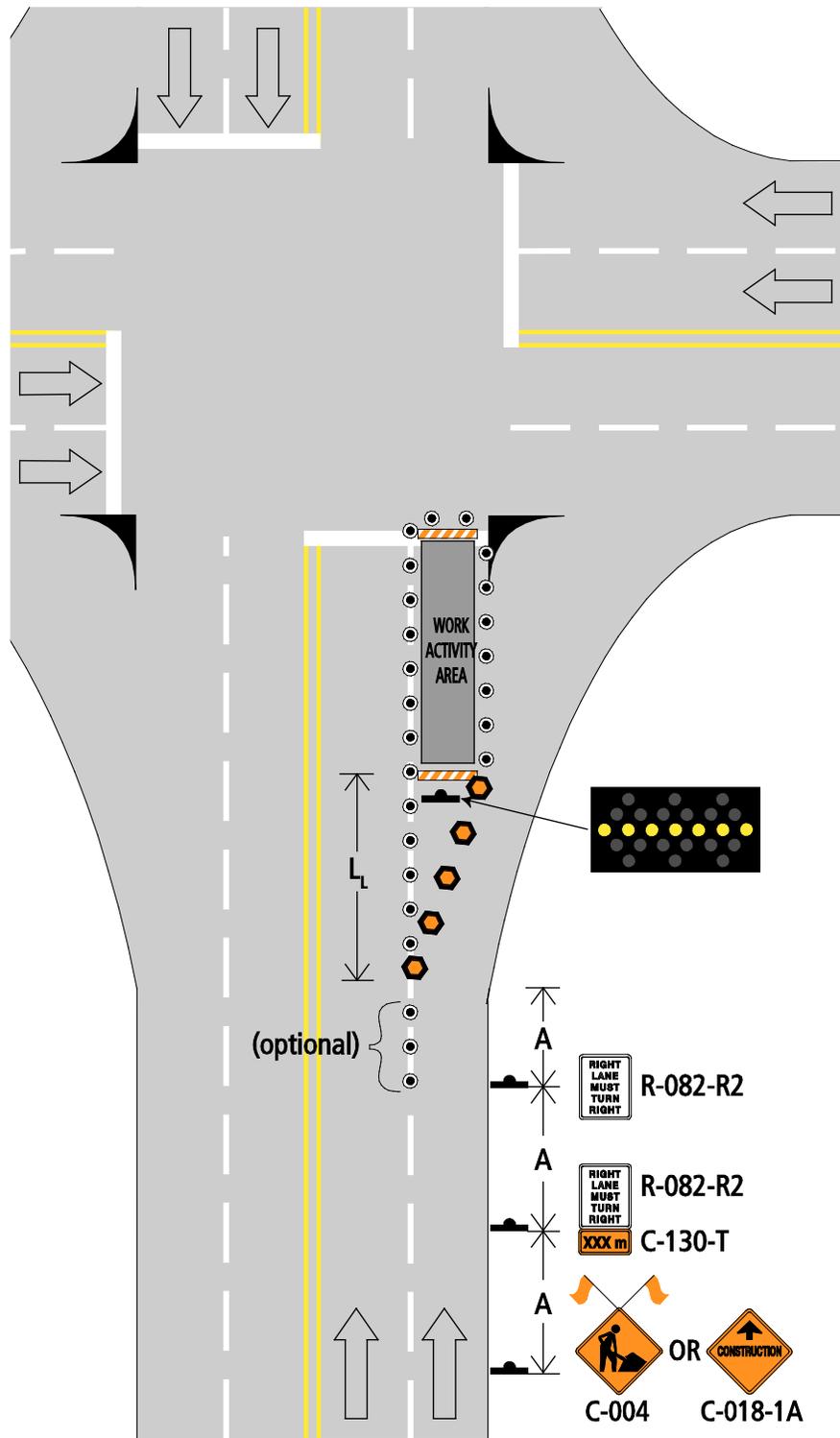
Guidance:

- To direct right-turn vehicular traffic into the right-turn lane, tubular markers or drums should be placed in a line parallel to the pavement edge to create a taper.
- Median-mounted signs matching the shoulder-mounted signs should be used where space allows.

Options:

- To separate traffic earlier in advance of the work area, additional channelizing devices may be placed along the dashed lane line to separate the left and right lanes.

Figure 11.10: Right Lane Closure with Right-Turn Lane (Near Side) – Channelized Right Turn Open – Multilane Intersection – Short and Long Duration



11.11 Two Lanes Closed (Near Side) – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a double lane closure on a multilane roadway when the closure occurs on the approach to (near side of) an intersection.

Both through lanes are closed, and through traffic is diverted into the left-turn lane to accommodate its movement through the intersection.

Standard:

- Traffic shall be merged into a single lane before approaching the left-turn and right-turn lanes.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab is required in advance of a second Right Lane Closed Ahead C-130-R sign.
- A double-sided taper shall be indicated with drums, and a Double Hazard C-154-D marker shall be positioned in advance of the work area to direct traffic to the left and right lanes.
- Flashing arrow boards (FABs) shall be positioned as follows:
 - FAB #1 in arrow mode: in the right lane drop taper in advance of the work area
 - FAB #2 in caution mode: inside the work area taper in advance of the work

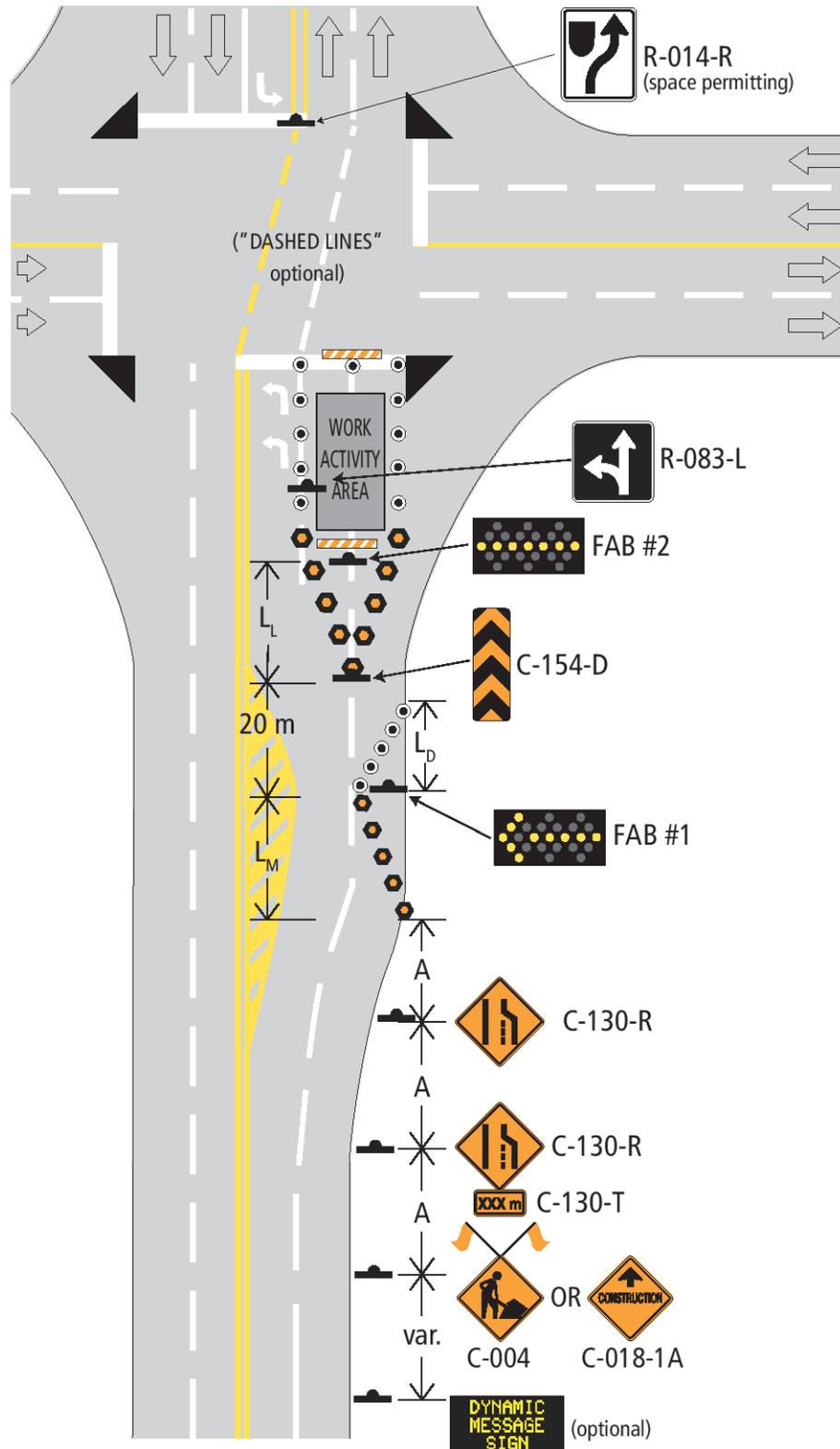
Guidance:

- It is intended that traffic moving through the intersection use the left-turn lane. Signal timings may have to be adjusted in all directions at signalized intersections.
- A lane use sign, such as the Lane Use R-083-L sign, should be positioned before the intersection to provide clarity for drivers.
- Median-mounted signs matching the shoulder-mounted signs should be used where space allows.

Options:

- Temporary dashed pavement marking may be added across the intersection to guide traffic through the intersection into the downstream lane.
- If the speed limit is ≤ 60 km/h:
 - The upstream Right Lane Closed Ahead C-130-R sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
 - A Lane Closure Arrow C-053 sign may replace FAB #1

Figure 11.11: Two Lanes Closed (Near Side) – Multilane Intersection – Short and Long Duration



11.12 Two-Lane Closure – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a double lane closure on a multilane roadway where the closure occurs both upstream (near side) and downstream (far side) of a signalized or stop-controlled intersection, but not through the intersection itself.

Traffic from the closed lanes is re-routed across the centreline into the opposing travel lane through a median crossover, and the number of lanes available for opposing traffic is reduced using lane drops. The placement and maintenance of channelizing devices is critical.

Standard:

- Flashing arrow boards (FABs #1, #2, #3, and #4) in arrow mode are required in advance of the work area on the major road, and shall be positioned inside the approaching taper for each closed lane or lane shift.
- Two-Way Traffic Ahead C-132 signs shall be used in advance of locations where two-way traffic begins.
- Two-Way Traffic R-010 signs shall be used along tangents where two-way traffic has been established.
- A Keep Right R-014-R sign shall be placed on the far side of the intersection to direct drivers to keep right.

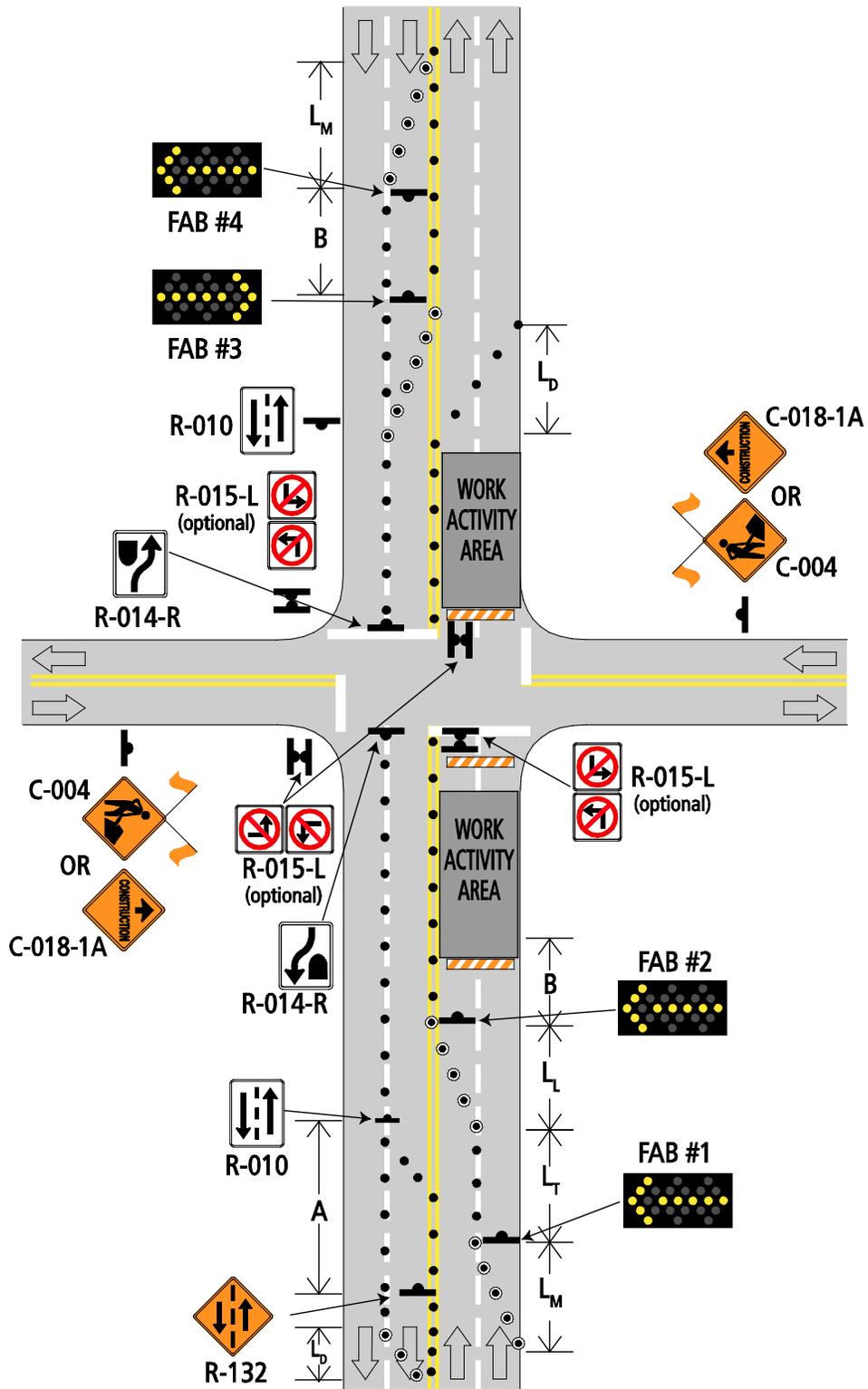
Guidance:

- Median-mounted signs matching the shoulder-mounted signs should be used where space allows.

Options:

- Temporary dashed pavement marking may be added across the intersection to guide traffic through the intersection into the downstream lane.
- If the speed limit is ≤ 60 km/h:
 - A Lane Closure Arrow C-053 sign may replace FAB #2 and FAB #3

Figure 11.12: Two-Lane Closure – Multilane Intersection – Short and Long Duration



11.13 Multiple Lane Closure (Far Side) with Dedicated Left-Turn Lane – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup for a double lane closure on a multilane roadway when the closure occurs downstream (far side) of an intersection.

Traffic from the closed lanes is merged into the left-turn lane on the upstream (near) side and travels through the intersection into the opposing left-turn lane.

The number of lanes available for opposing traffic is reduced, so the placement and maintenance of channelizing devices is critical.

Standard:

- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab is required in advance of a second Right Lane Closed Ahead C-130-R sign.
- A double-sided taper shall be indicated with drums, and a Double Hazard C-154-D marker shall be positioned in advance of the work to direct traffic to the left and right lanes.
- Flashing arrow boards (FABs) shall be positioned as follows:
 - FAB #1 in arrow mode: in the right lane drop taper in advance of the work area
 - FAB #2 in caution mode: inside the work area taper in advance of the work
- A Lane Closure Arrow C-053 sign shall be used in advance of the work area.

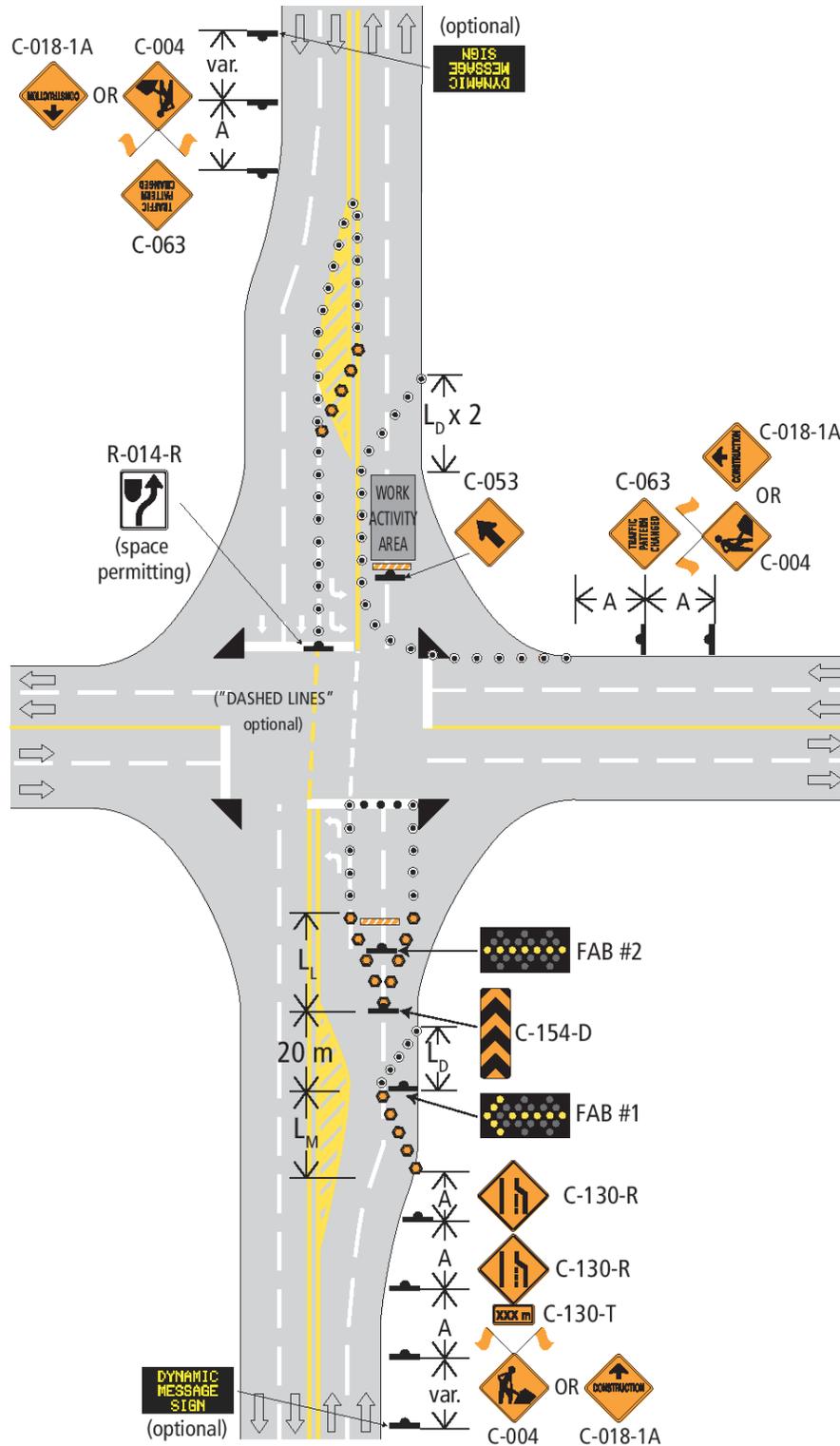
Guidance:

- Traffic moving through the intersection is intended to use the left-turn lane. Signal timings may have to be adjusted in all directions at signalized intersections.
- Median-mounted signs matching the shoulder-mounted signs should be used where space allows.

Options:

- A dynamic message sign may be used in advance of the work.
- Temporary dashed pavement marking may be added across the intersection to guide traffic through the intersection into the downstream lane.
- If the speed limit is ≤ 60 km/h:
 - The upstream Right Lane Closed Ahead C-130-R sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
 - A Lane Closure Arrow C-053 sign may replace FAB #1.

Figure 11.13: Multiple Lane Closure (Far Side) with Dedicated Left-Turn Lane – Multilane Intersection – Short and Long Duration



11.14 Midblock Sidewalk Detour – Multilane Roadway – Short and Long Duration

Purpose:

This layout shows the typical setup for a sidewalk detour that uses the outside lane of a multilane roadway or the parking lane of a two-lane, two-way roadway.

Standard:

- The pedestrian detour shall be clearly delineated so that the route is apparent to both pedestrians and motorists.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab is required in advance of a second Right Lane Closed Ahead C-130-R sign.
- The lane closure taper shall be delineated with drums.
- Flashing arrow boards (FABs) in arrow mode shall be used inside the approaching taper in advance of the work area and before the pedestrian route, and for speeds ≥ 70 km/h.

Guidance:

- Clear delineation of the pedestrian route can be achieved in various ways, such as using closely-spaced tubular markers, barricades, fencing, or temporary barriers.
- Temporary pedestrian access routes should be 1.5 metres wide or wider, with a minimum width of 1.2 metres where constraints exist.
- A hard, temporary walking surface should cover rough, soft, or uneven ground.
- At abrupt elevation changes (e.g., between sidewalk and road levels), a temporary curb ramp should be provided, with anti-slip treatment and a slope of 12:1 (8%) or less.
- When crosswalks, sidewalks, or other pedestrian facilities are blocked, closed, or relocated, temporary facilities should include accessibility features that are consistent with those in the existing pedestrian facility.

Options:

- Instead of a ramp, a boardwalk with a railing may be installed at sidewalk level around the closure for high-volume pedestrian areas or projects that last for several days or more.
- Depending on the type of work and the condition of the site, barricades may have to be supplemented with fencing or other devices to physically prevent pedestrians from straying into the work area (see [Section 4.10.1: Work Zone Fencing](#)).
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

11.15 Midblock Sidewalk Closure – Short and Long Duration

Purpose:

This layout shows the typical setup for a sidewalk detour that is not able to use the outside lane of a multilane roadway or the parking lane of a two-lane, two-way roadway.

This layout is used where a sidewalk is closed and pedestrians are detoured to another pedestrian facility. It affects only the path that pedestrians must follow, and has no impact on traffic.

Standard:

- The sidewalk shall be closed using a barricade and a Sidewalk Closed C-202 sign on both sides of the work.
- A second barricade with a Sidewalk Closed – Cross Here C-203-L/R sign shall be placed in advance of the closure to advise pedestrians of a suitable alternative crossing.
- The pedestrian detour shall be clearly delineated so that the route is apparent to pedestrians.

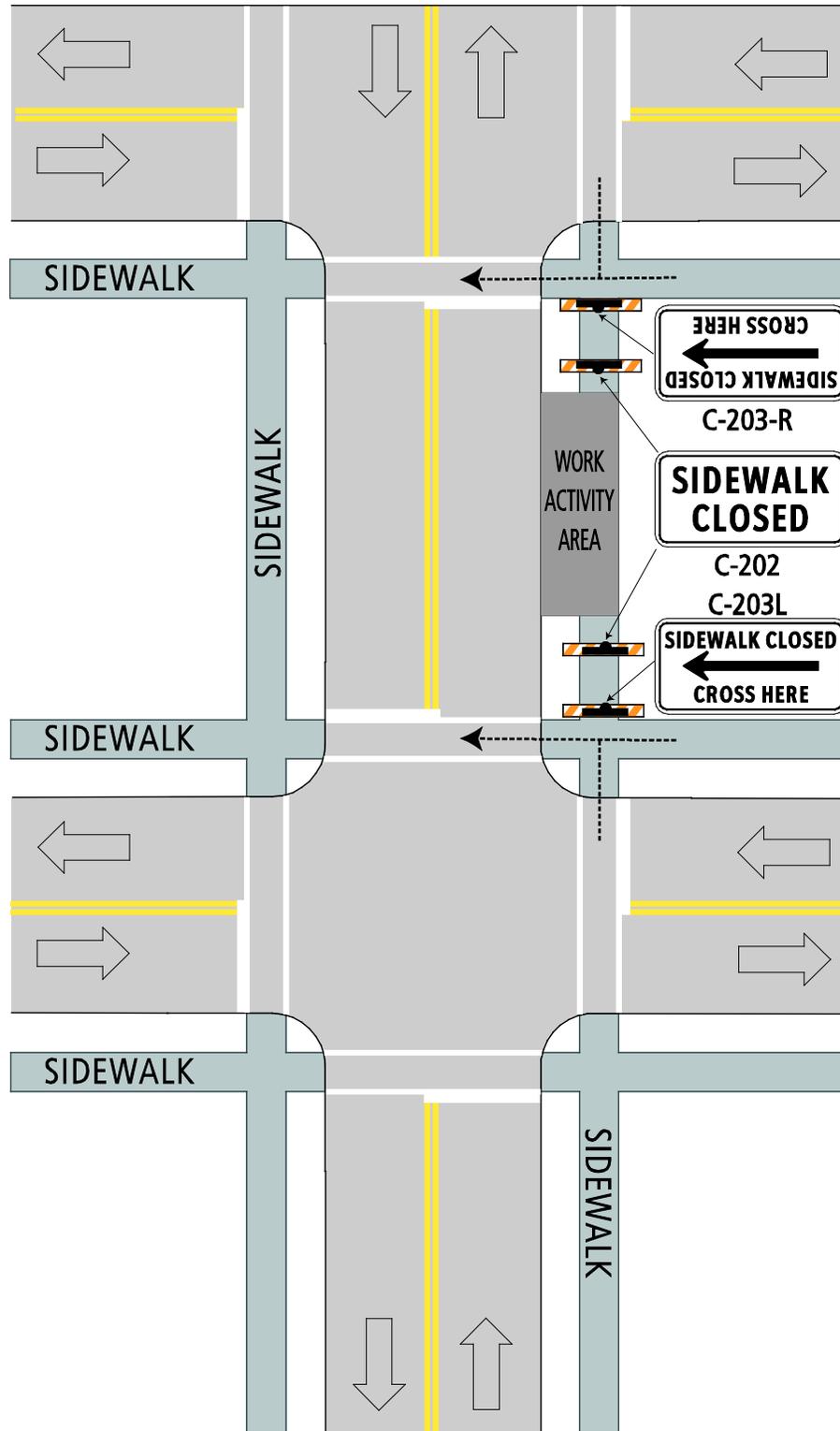
Guidance:

- Pedestrians should be notified of the closure both in advance of the closure and at the closure itself.
- Pedestrians should be advised of the location of an available crosswalk that they can use to cross the road and access a sidewalk on the other side.
- When crosswalks, sidewalks, or other pedestrian facilities are blocked, closed, or relocated, temporary facilities should include accessibility features that are consistent with those in the existing pedestrian facility.
- The roadway may require delineation if the sidewalk work encroaches onto it.

Options:

- Depending on the type of work and the condition of the site, the barricades may have to be supplemented with fencing or other devices to physically prevent pedestrians from straying into the work area (see [Section 4.10.1: Work Zone Fencing](#)).

Figure 11.15: Midblock Sidewalk Closure – Short and Long Duration



11.16 Sidewalk Detour – Multilane Intersection – Short and Long Duration

Purpose:

This layout shows the typical setup at an intersection and on a corner for a sidewalk detour onto a multilane roadway or a two-lane, two-way roadway that has a parking lane. Where possible, the crosswalks should be kept open.

Standard:

- The pedestrian detour shall be clearly delineated so that it is apparent to both pedestrians and motorists.
- A right lane closure is required for any area where the sidewalk detours into the travel lane:
 - A Right Lane Closed Ahead C-130-R sign and a second C-130-R sign with a C-130-T distance tab are required on the leg of the intersection where traffic is being merged to one lane.
 - In the cross direction, a Right Lane Closed C-030-4A sign is required in advance of the intersection, followed by a Right Lane Must Turn Right R-082-R2 sign to advise that traffic in the outside lane cannot go through the intersection and must turn right.
- The lane closure taper shall be delineated with drums.
- Flashing arrow boards (FABs) in arrow mode shall be used inside the approaching taper in advance of the work area and before the pedestrian route, and for speeds ≥ 70 km/h.

Guidance:

- Pedestrian signals controlling closed crosswalks should be covered or deactivated.
- Clear delineation of the pedestrian route can be achieved in various ways, such as using closely-spaced tubular markers, barricades, fencing, or temporary barriers.
- Temporary pedestrian access routes should be 1.5 metres wide or wider, with a minimum width of 1.2 metres where constraints exist.
- A hard, temporary walking surface should cover rough, soft, or uneven ground.
- At abrupt elevation changes (e.g., between sidewalk and road levels), a temporary curb ramp should be provided, with anti-slip treatment and a slope of 12:1 (8%) or less.
- When crosswalks, sidewalks, or other pedestrian facilities are blocked, closed, or relocated, temporary facilities should include accessibility features that are consistent with those in the existing pedestrian facility.

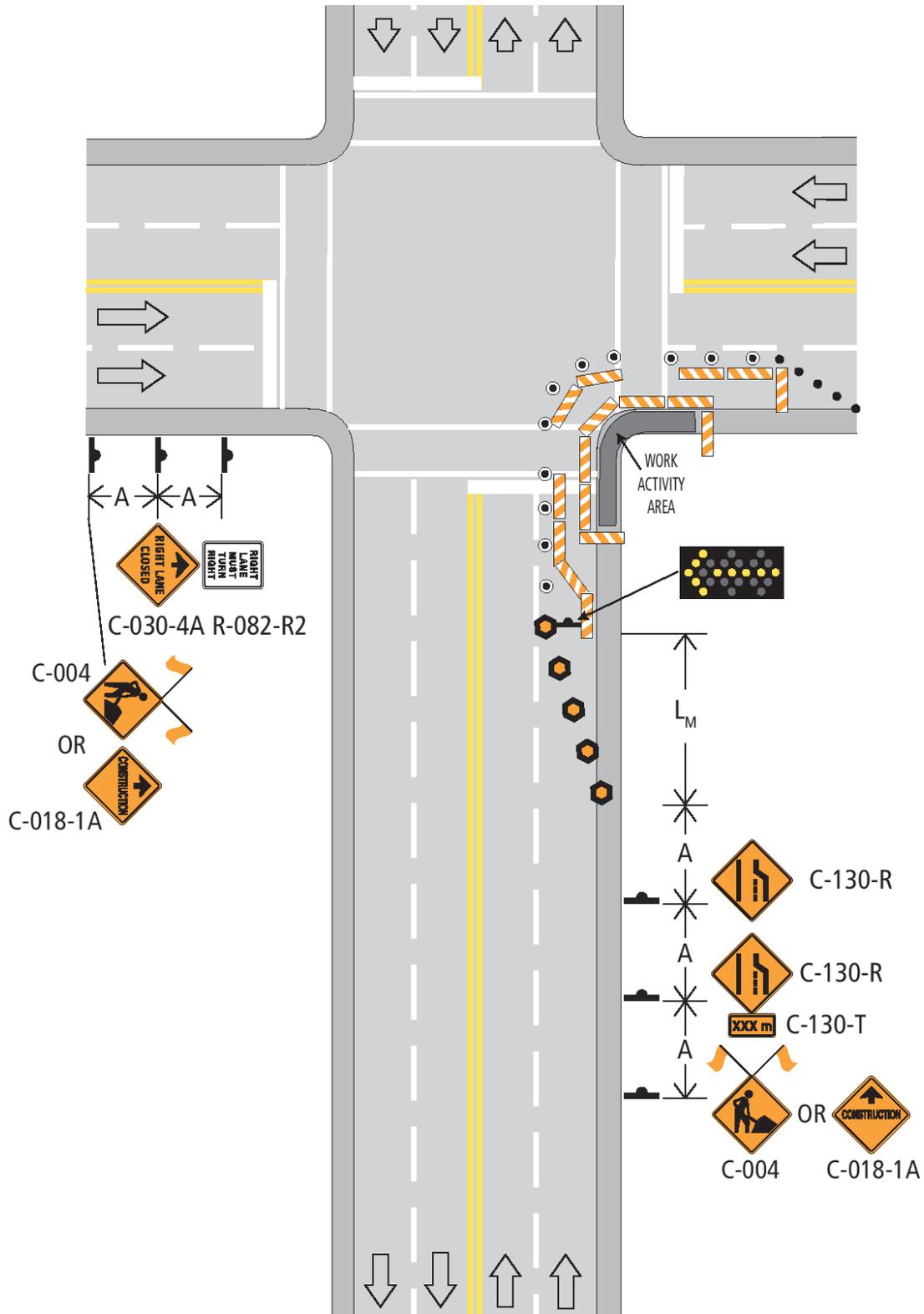
Options:

- A full lane closure may be considered for the right lane of the cross street if high volumes of traffic are attempting to proceed straight through the intersection or if there is confusion about the Right Turn Only signage.
- Instead of a ramp, a boardwalk with a railing may be installed at sidewalk level around the closure for high-volume pedestrian areas or projects that last for several days or more.
- Depending on the type of work and the condition of the site, barricades may have to be supplemented with fencing or other devices to physically prevent pedestrians from straying into the work area (see Section 4.10.1: Work Zone Fencing).
- If the speed limit is ≤ 60 km/h:
 - The upstream Right Lane Closed Ahead C-130-R sign may be omitted and the Crew Working Ahead C-004 sign or Construction Ahead C-018-1A sign moved downstream by Table B Distance A.
 - Tubular markers may be used for leading tapers instead of drums.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

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Figure 11.16: Sidewalk Detour – Multilane Intersection – Short and Long Duration



11.17 Intersection Sidewalk and Crosswalk Closure – Short and Long Duration

Purpose:

This layout shows the typical setup where crosswalks at an intersection are affected by sidewalk or roadside work on one of the intersection corners.

In this situation, the affected crosswalk cannot be used, and a detour in advance of the closure is required to direct pedestrians to another pedestrian facility.

Standard:

- The pedestrian detour shall be clearly delineated so that the route is apparent to both pedestrians and motorists.
- Barricades shall be used to close both the sidewalk approach and the crosswalk approach to prevent access to the work area.
- Barricades immediately adjacent to the work shall display Sidewalk Closed C-202 signs.
- Additional barricades with Sidewalk Closed – Cross Here C-203-L/R signs shall be placed in advance of the closure to advise pedestrians of a suitable alternative crossing.

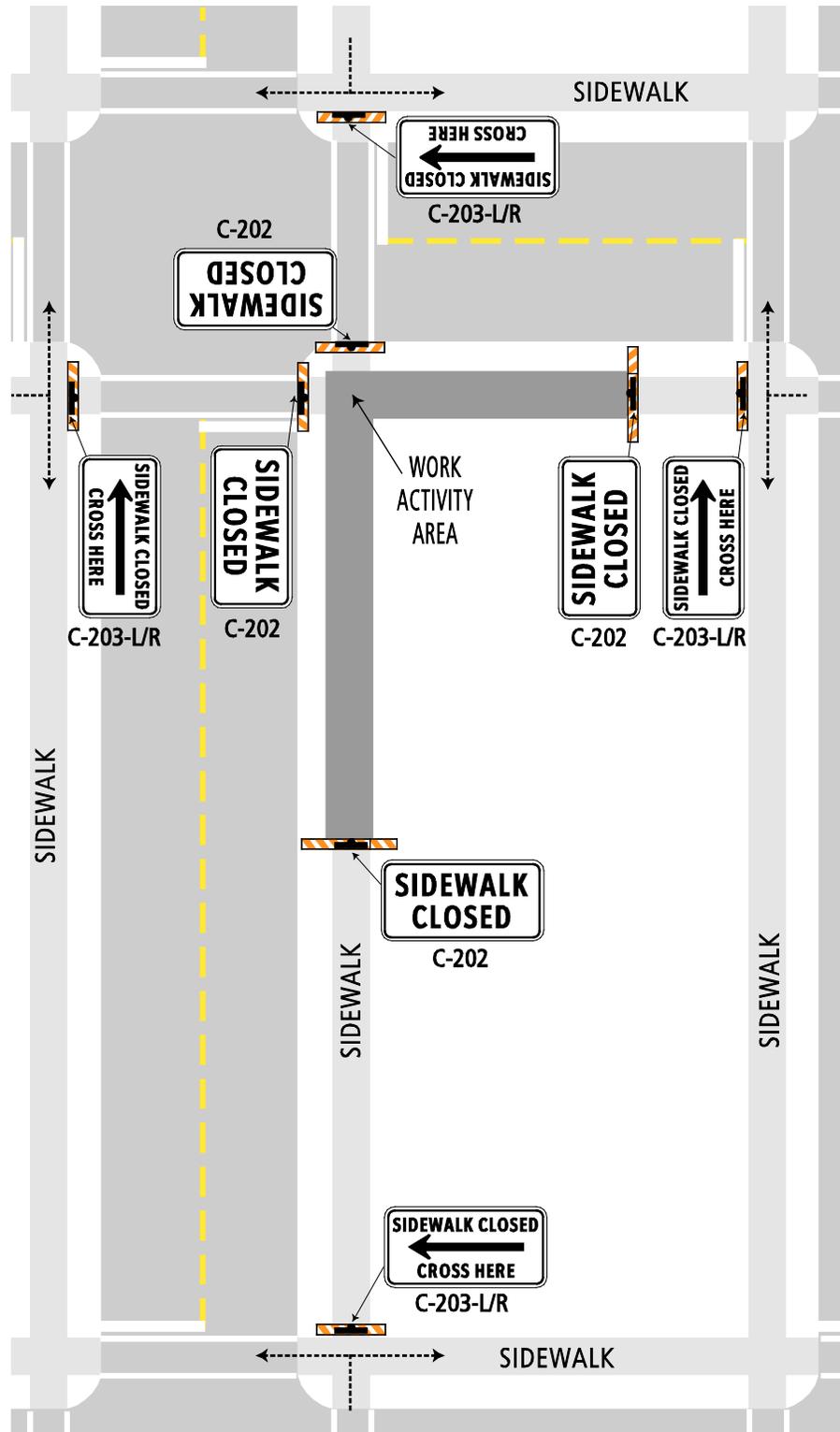
Guidance:

- Pedestrian signals controlling closed crosswalks should be covered or deactivated.
- Pedestrians should be notified of the closure both in advance of the closure and at the closure itself.
- Pedestrians should be advised of the location of an available crosswalk that they can use to cross the road and access a sidewalk on the other side.
- When crosswalks, sidewalks, or other pedestrian facilities are blocked, closed, or relocated, temporary facilities should include accessibility features that are consistent with those in the existing pedestrian facility.
- The roadway may require delineation if the sidewalk work encroaches onto it.

Options:

- A temporary crosswalk may be implemented if there is no nearby pedestrian crossing opportunity.
- If a temporary midblock crosswalk is implemented, curb parking should be prohibited within 30 metres in advance of the midblock crosswalk.

Figure 11.17: Intersection Sidewalk and Crosswalk Closure – Short and Long Duration



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PART B – TRAFFIC CONTROL

Section 12: Traffic Control Layouts – Roundabouts¹

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¹ See [Section 11: Traffic Control Layouts](#) – Intersections for information on traffic control layouts for other intersections.

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PART B – TRAFFIC CONTROL

Section 12: Traffic Control Layouts – Roundabouts

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

12.1 General Information - Roundabouts¹

1. The one-way flow and roadway geometry of roundabouts combine to make them significantly different from most other intersections negotiated by drivers.
2. Temporary traffic control during maintenance and construction activities at roundabouts should provide clear guidance to drivers, some of whom may be unfamiliar with roundabout operations.
3. Some basic features of roundabouts that are mentioned throughout this section are shown below in [Figure 12.1: Generic Two-Lane Roundabout](#).

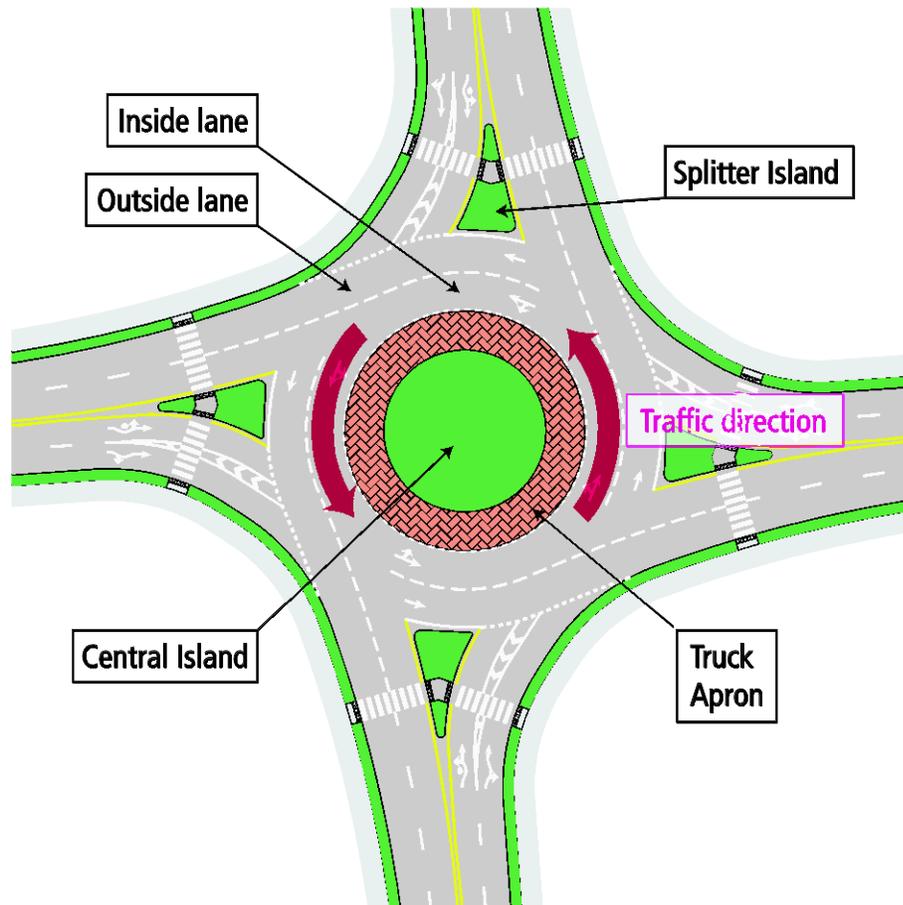


Figure 12.1: Generic Two-Lane Roundabout

¹ See [Section 11: Traffic Control Layouts – Intersections](#) for information on traffic control layouts for other intersection types.

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign shall be used.
- For long-duration work, a Construction Ahead C-018-1A sign shall be used.
- A Prepare to Stop C-029 and Traffic Control Person Ahead C-001-1 signs shall be used in advance of TCPs.
- Existing directional signs that are contrary to the new flow of traffic shall be covered.

Guidance:

- Using tubular markers rather than drums allows for better sight lines between TCPs and vehicle queues, and provides more room for large vehicles to navigate through the roundabout.

Options:

- The Flagger Ahead C-001-2 sign may be used for additional advance warning where TCPs are stopping traffic
- A portable dynamic message sign (DMS) may be used to provide advance messaging for drivers.
- In low speed (≤ 60 km/h) urban areas (within municipal boundaries), customization of traffic control layouts, including closer device spacing and shorter taper lengths, may be necessary to maintain access and mobility. In these cases, document why adjustments are being made.

12.2 Lane Closure in Roundabout – Single Lane – Short and Long Duration

Purpose:

This layout shows the typical setup where an area within the roundabout or the approach to the roundabout is obstructed, preventing traffic from entering the roundabout in its normal path. It is typically used for short-duration work, but it may also be used for long-duration work.

As is the case for traffic control at a signalized or stop-controlled intersection, a Traffic Control Person is required for each approach leg entering the roundabout because traffic is being directed in the opposite direction through the roundabout.

Standard:

- The TCPs shall have communication with one another.
- Overhead lighting shall illuminate each TCP location at night.
- The TCP on each approach leg shall hold traffic so that only one direction proceeds at a time.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.
- Channelizing devices shall be used to isolate the work activity area and guide traffic through the roundabout.
- Barricades are required at each end of the work activity area for long-duration work.

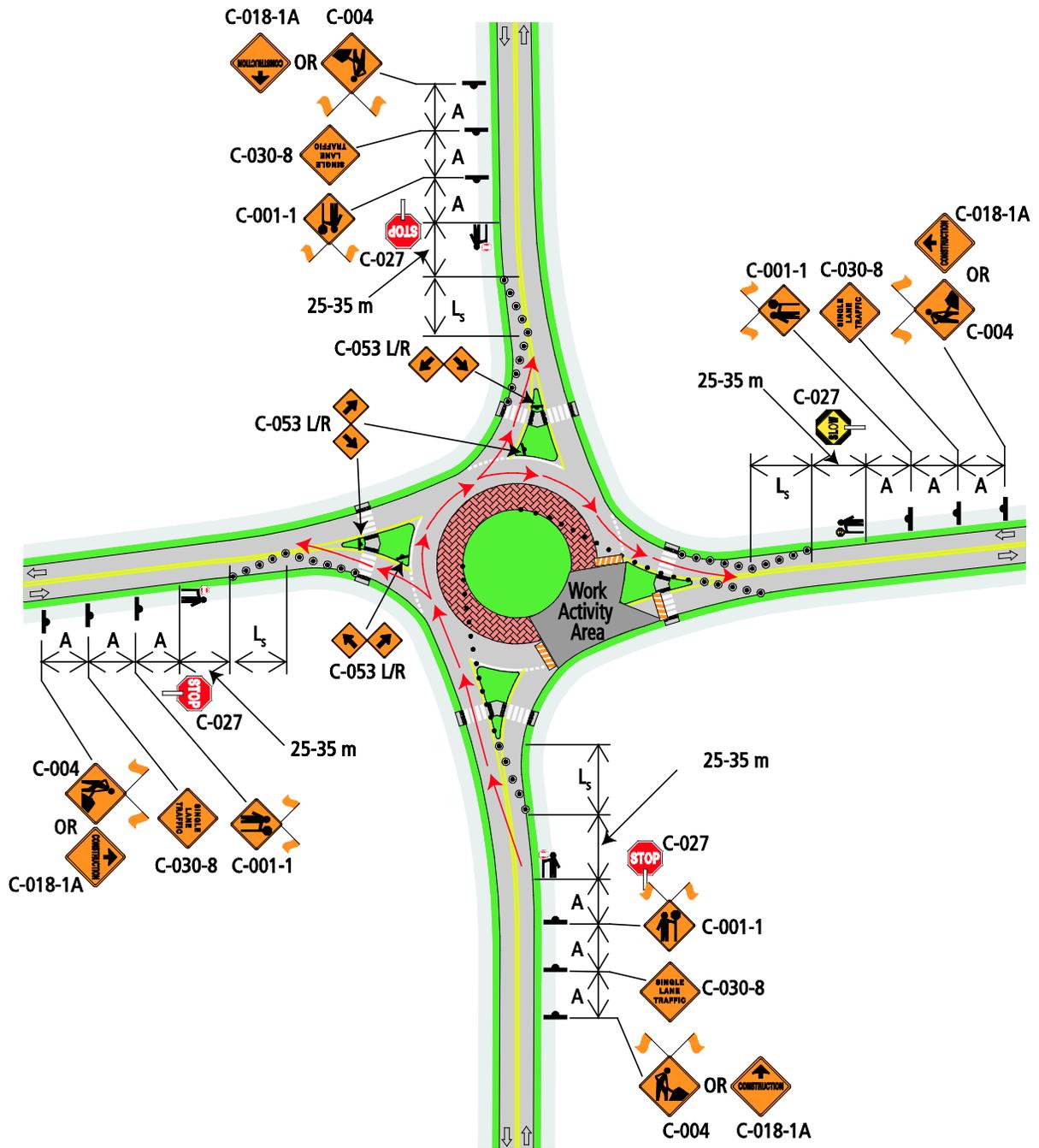
Guidance:

- Where traffic must travel counter to its normal flow because of a full closure within the roundabout, additional signing to direct drivers may be needed on splitter islands and/or within the roundabout central island (e.g., detour signs with arrows).

Options:

- Additional signing in the central island may be necessary to assist traffic movement through roundabout.
- Where approach speeds are ≤ 60 km/h, cones may be used instead of tubular markers.
- The truck apron may be used as part of a temporary lane to divert traffic around a lane closure within the roundabout.
- An additional TCP stationed within the central island may assist in directing drivers.
- If all the work is contained within the central island and does not affect the travel lanes, one sign per approach may be sufficient (i.e., a Crew Working Ahead C-004 sign for short-duration work or a Construction Ahead C-018-1A sign for long-duration work).

Figure 12.2: Lane Closure in Roundabout – Single Lane – Short and Long Duration



12.3 Work Outside Roundabout – Short and Long Duration

Purpose:

This layout shows the typical setup where a lane is closed on an approach to—or a departure from—a roundabout but traffic is still able to enter and proceed through the roundabout in its normal path.

As is the case for a single lane alternating setup, one Traffic Control Person is typically required on each side of the work. Advance warning signage is required on each leg entering the roundabout.

Since the closure does not affect the roundabout itself, traffic flows counter-clockwise as usual through the roundabout.

If traffic cannot use the regular entrance into the roundabout, use the layout described in [Section 12.2: Lane Closure in Roundabout – Single Lane](#).

Standard:

- A Lane Closure Arrow C-053 sign shall be placed on the central island to direct traffic back into the right lane.
- Channelizing devices shall be used to isolate the work area and guide traffic into the roundabout.
- Barricades are required at each end of the work activity area for long-duration work.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.

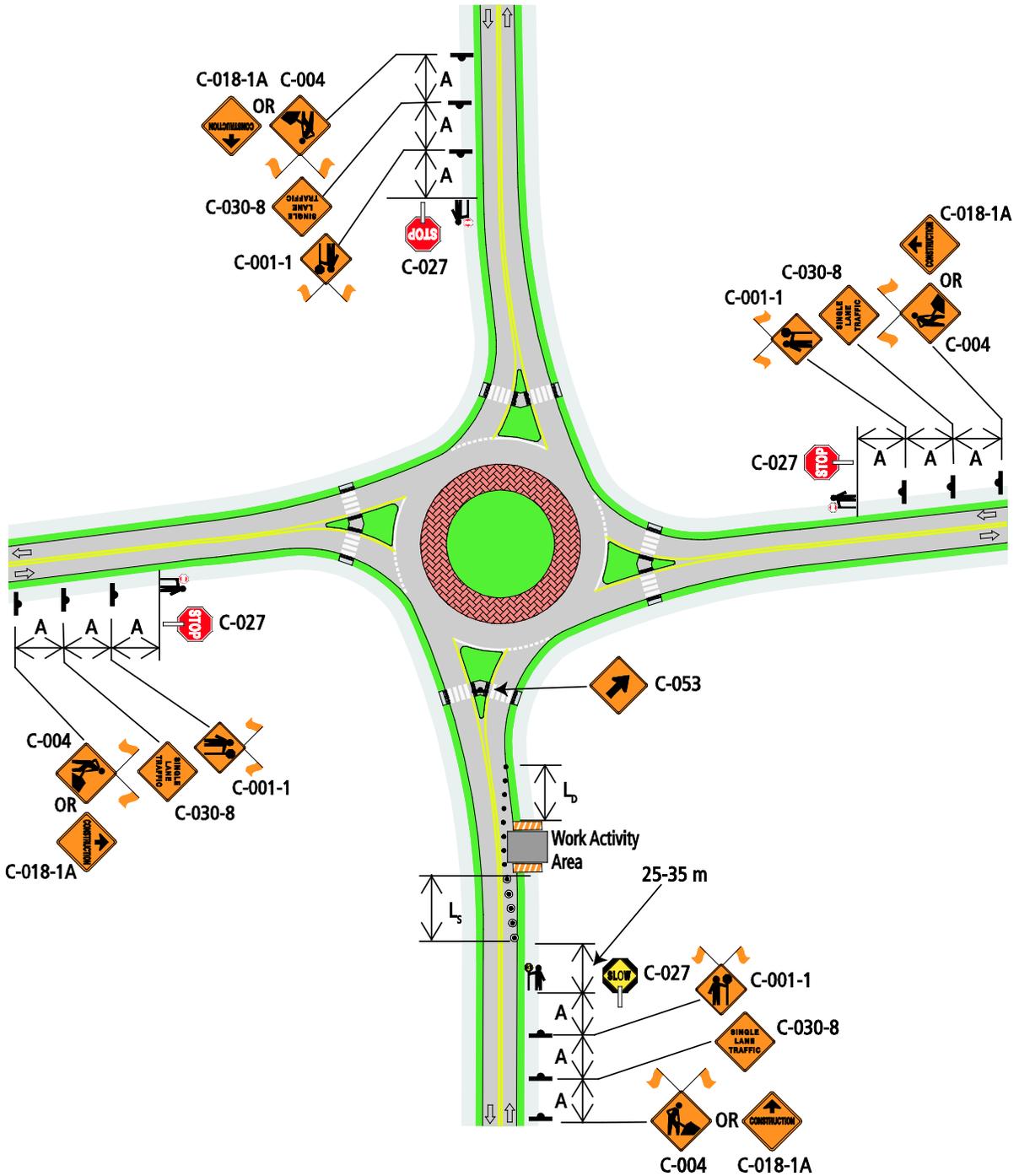
Guidance:

- Depending on the distance between TCPs, radios may be used to improve communication.

Options:

- Where approach speeds are ≤ 60 km/h, cones may be used instead of tubular markers.
- In simpler situations, or where traffic volumes are low, the movement of traffic around the closure may be controlled by as few as two TCPs on the affected leg.

Figure 12.3: Work Outside Roundabout – Short and Long Duration



12.4 Inner Lane Closure – Multilane Roundabout – Short and Long Duration

Purpose:

This layout shows the typical setup for an inner lane closure within a multilane roundabout.

Traffic Control Persons may not be required because traffic should be able to self-regulate, using the roundabout as if it were a single-lane roundabout.

Standard:

- A Left Lane Closed C-030-3A sign is required in advance of the roundabout, followed by the corresponding Left Lane Closed Ahead C-130-L sign.
- A flashing arrow board (FAB) shall be used inside each taper.
- A Lane Closure Arrow C-053 sign is required on the outside edge of the inner lane.
- Channelizing devices shall be used to isolate the work area and separate the inner and outer lanes.

Guidance:

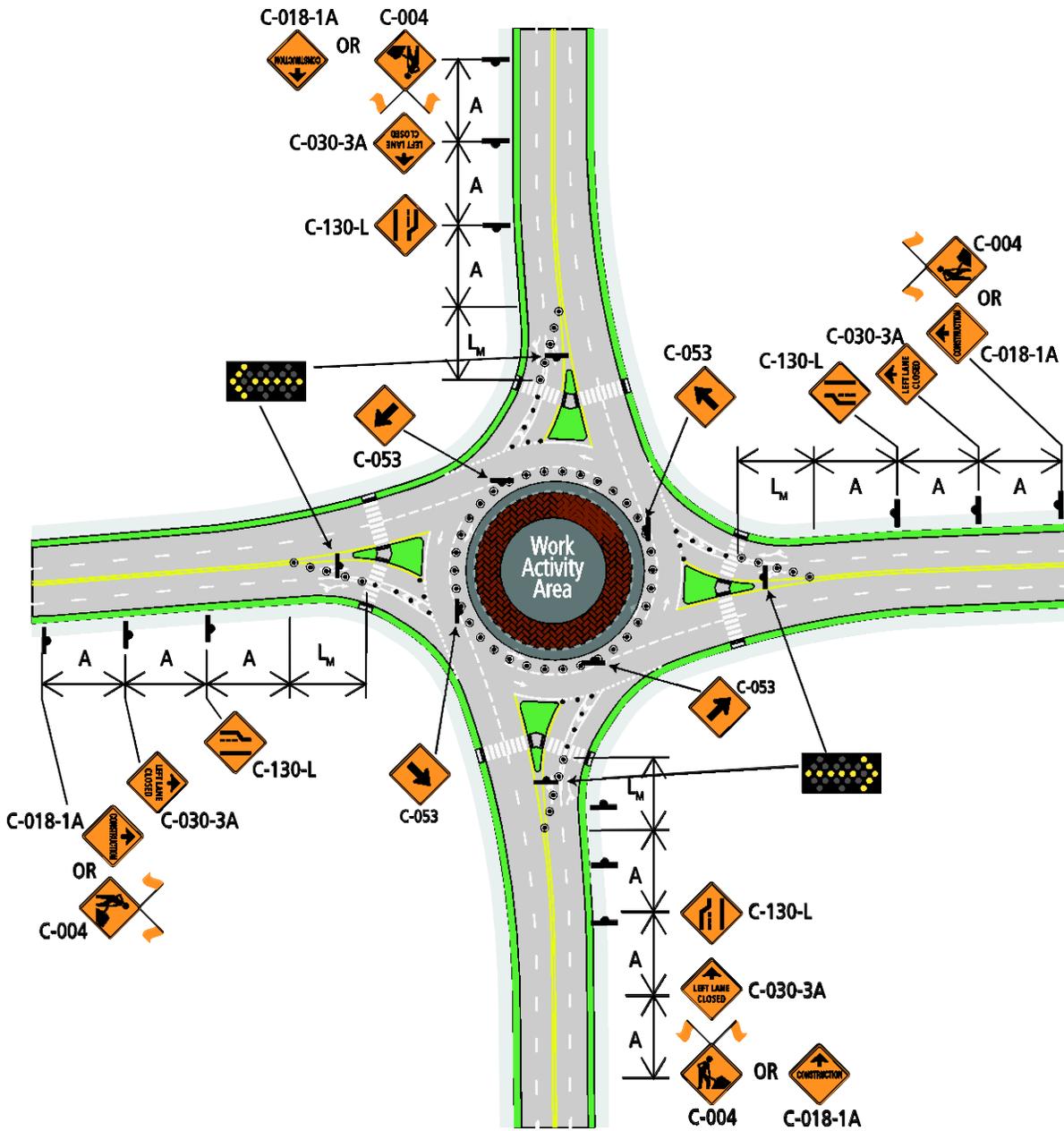
- Existing signs regarding lane use may have to be covered because the roundabout will be operating as a single-lane roundabout.
- Device positioning may have to be adjusted to accommodate long and combination vehicles, which require more room to navigate through roundabouts.

Options:

- Where approach speeds are ≤ 60 km/h, cones may be used instead of tubular markers.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 12.4: Inner Lane Closure – Multilane Roundabout – Short and Long Duration



12.5 Outer Lane Closure – Multilane Roundabout – Short and Long Duration

Purpose:

This layout shows the typical setup for an outer lane closure within a multilane roundabout.

It is used to isolate the work area and guide traffic through the roundabout in the inner lane while also leaving space for traffic to enter and exit the inner lane.

Traffic Control Persons may not be required because traffic should be able to self-regulate, using the roundabout as if it were a single-lane roundabout.

Standard:

- A Right Lane Closed C-030-4A sign is required in advance of the roundabout, followed by the corresponding Right Lane Closed Ahead C-130-R sign.
- A flashing arrow board (FAB) shall be used inside each taper.
- A Lane Closure Arrow C-053 sign shall be positioned just inside the work area to warn traffic navigating the roundabout that the outer lane is closed.
- Barricades are required on approaches to the work activity area for long-duration work.

Guidance:

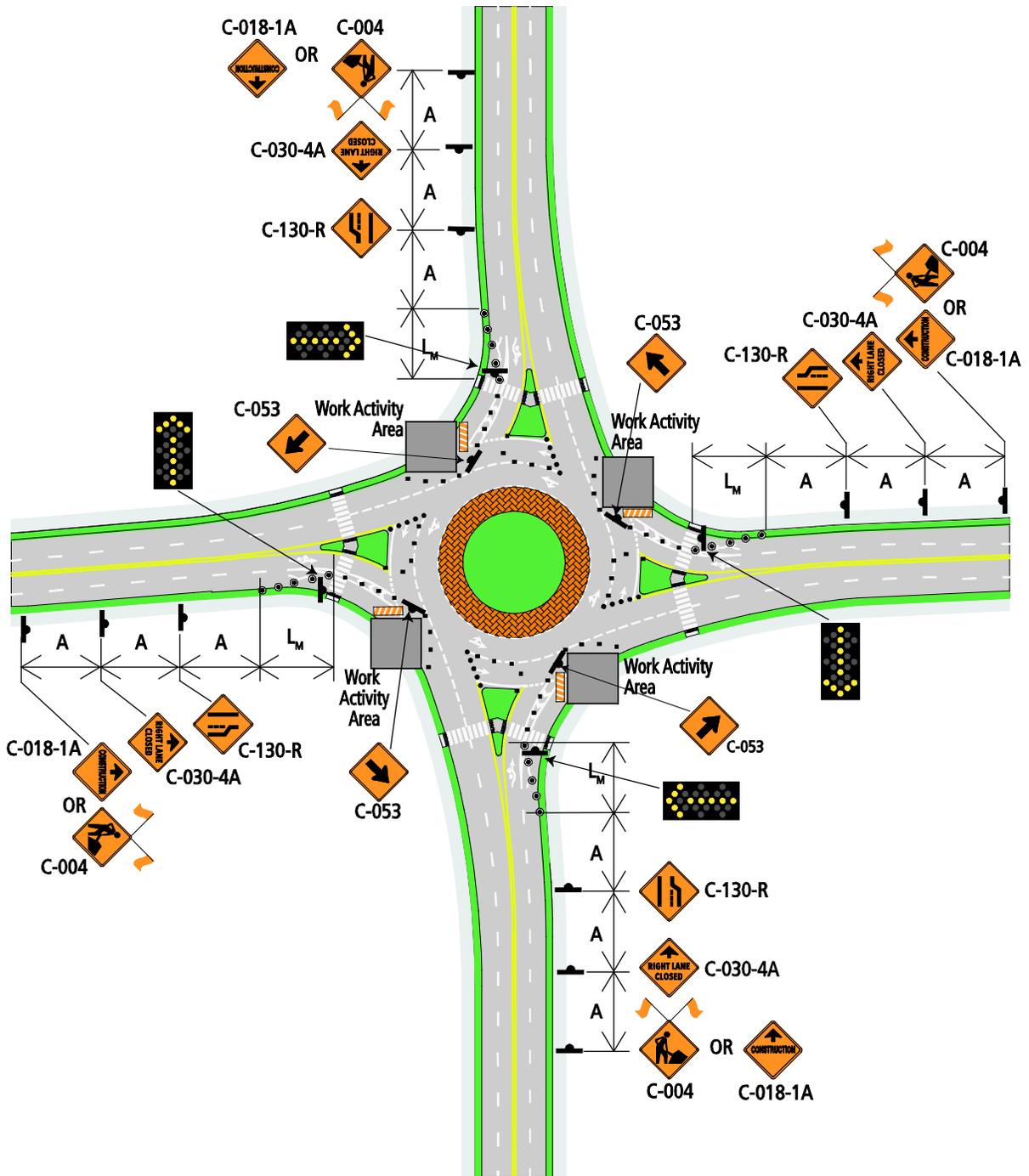
- Device positioning may have to be adjusted to accommodate long and combination vehicles, which require more room to navigate through roundabouts.
- It may be difficult for large vehicles to turn right to exit the roundabout. Additional guidance can be provided by using the Roundabout Right Turn Truck Signs C-121-1 series, which directs drivers to circumnavigate the roundabout so that they re-approach the exit straight-on.
- It may be necessary to detour large trucks from the area during construction.

Options:

- Where approach speeds are ≤ 60 km/h, cones may be used instead of tubular markers.
- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 12.5: Outer Lane Closure – Multilane Roundabout – Short and Long Duration



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PART B – TRAFFIC CONTROL

Section 13: Traffic Control Layouts – Milling, Paving, Seal Coating Contents

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PART B – TRAFFIC CONTROL

Section 13: Traffic Control Layouts – Milling, Paving, Seal Coating

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

13.1 General Information - Milling, Paving, and Seal Coating

Milling, paving, and seal coating are specific types of work that occur on a variety of roadways. The appropriate traffic control layout in this Manual should be chosen for the environment in which the work will occur.

Condition-specific signs should provide drivers with information about the specific site conditions, which may include, but are not limited to:

- low shoulders
- fresh oil
- dust
- uneven pavement lifts
- loose gravel
- bumps
- no pavement markings
- grooved pavement

The signage for low shoulders and uneven pavement lifts requires particular attention because these conditions are not easily detected in darkness or poor weather.

In addition, these principles should be incorporated into traffic control layouts:

1. Warning signs should be repeated as necessary for long sections of affected roadway.
2. Specific signage for motorcyclists and cyclists—for example, the Rough Surface C-019 series and the Bike Hazard C-183 series—should be used in advance of changes to the pavement surface that can affect stability for these road uses, such as gravelled or milled surfaces.
3. The positioning of Construction Speed Zones should be changed as necessary to keep them as short as possible and to avoid requiring drivers to proceed at unreasonably low speeds. Construction Speed Zones should be removed or relocated from areas where the work has been completed so that the speed reductions are specifically appropriate for the active work areas or the areas where hazards exist because of incomplete work.
4. More than one Construction Speed Zone may be used throughout the length of the project, with long zones requiring Maximum Speed R-004 signs and Construction Speed Zone C-080-T tabs to be repeated as necessary. The ends of Construction Speed Zones are to be marked with Maximum Speed R-004 signs that show normal speed limits.
5. For typical pilot car operations, see [Section 4.11.9: Pilot Cars for Work Zones](#) and [Section 7.16: Pilot Cars](#). The signs described in Section 7.16 can also be incorporated into other applications and layouts.
6. Signs should be moved to keep up with moving paving and seal coating operations.

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- A No Passing R-022 sign shall be used in areas where passing is prohibited.
- A Passing Permitted R-023 sign shall be used in areas where passing is permitted within the project area.

Guidance:

- None at this time.

Options:

- Where cyclists are regularly observed using the shoulder, a Share the Road W-132-1 sign may be used with an appropriate cycling hazard tab (see [Section 18: Traffic Control Layouts – Bicycle Lanes](#) for additional information).

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13.2 Benkleman Beam and Falling Weight Deflectometer Testing

The **Benkleman Beam** is a pavement-testing device that measures the deflection of flexible asphalt in order to determine the strength of the road. The worker doing the testing is required to leave the work vehicle to perform the test.

Benkleman Beam testing may take place in travelled lanes. In these cases, a spotter may be beneficial to provide additional situational awareness to the worker regarding vehicle arrivals.

The **Falling Weight Deflectometer** is a pavement-testing device mounted on a small trailer that is towed by a van. Tests are usually made at intervals of between 20 and 100 metres, with the test unit typically stopping for a maximum of 45 seconds per test. The worker doing the testing does not have to leave the work vehicle to perform the test.

Both of these operations are normally classified as mobile work (see [Section 10: Traffic Control Layouts – Mobile Work](#)).

- For testing on two-lane, two-way roadways with light traffic volumes and good visibility, see [Section 10.3: Intermittently-Moving Work – Two-Lane, Two-Way Roadway](#).
- For testing on multilane roadways, see [Section 10.5: Intermittently-Moving Work – Multilane Undivided or Divided Roadway](#).
- If traffic volumes are high or conditions prevent traffic from self-regulating, see [Section 7.8: Lane Closure with TCPs – Single Lane Alternating](#).
- A buffer vehicle should be used on high-speed, high-volume roadways.
- When Truck Stopped on Road Next 2 km C-038 signs are used for testing operations, the maximum distance between the two opposing C-038 signs should not exceed 2 kilometres except for Falling Weight Deflectometer operations on rural highways, for which it should not exceed 8 kilometres.

13.3 Advance Warning for Paving Work

Purpose:

This layout shows the typical setup for the advance warning area for paving projects.

Paving projects can cover long distances, with work occurring in only one small section at a time, so it is important to identify the project area and the work activity areas separately. Advance warning signage should identify the extent of the project limits and advise road users of upcoming work activity areas.

Standard:

- A dynamic messaging sign (DMS) is required to provide road users with relevant project information.
- A No Passing R-022 sign shall be used in areas where passing is prohibited.
- A Passing Permitted R-023 sign shall be used in areas where passing is permitted within the project area.
- A Paving Ahead Next XX km C-008-1 sign with the appropriate C-008-OL distance overlay shall be used in advance of the Limits of Construction (LoC) to advise drivers of the length of the paving work.

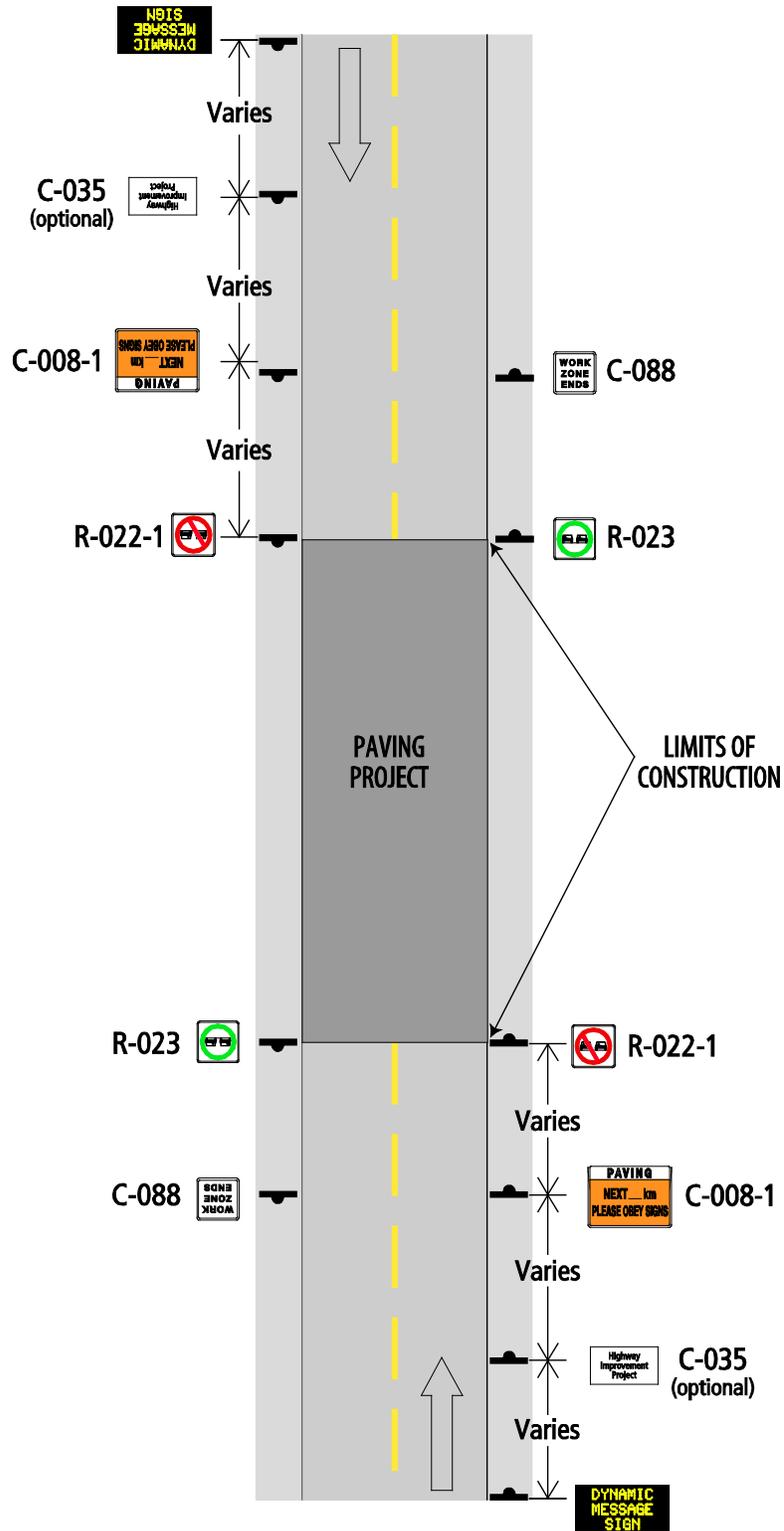
Guidance:

- The dynamic messaging sign (DMS) may be positioned before or after the Construction Project C-035 sign.
- As shown in the diagram, the distance between the Paving Ahead Next XX km C-008-1 sign and the LoC varies as the work activity area moves through the project area.
- When the work is occurring close to the LoC, all other signs preceding the work activity area should be in place first. This may push the C-008-1 sign back from the edge of the LoC during this period.
- See [Section 13.4: Paving – Work in Progress](#) for advance warning signage requirements for a work activity area that is located close to the LoC.
- Paving Ahead Next XX km C-008-1 signs with the appropriate C-008-OL distance overlays should be repeated at various distance intervals in advance of the active work area.

Options:

- Additional signs may be required throughout the advance warning area and repeated as necessary (see [Appendix B: Standard Construction Signs](#)). These may include, but are not limited to:
 - Soft Shoulder C-012
 - Fresh Oil C-014
 - Single Lane Traffic C-030-8
 - Pavement Ends C-149

Figure 13.3: Advance Warning for Paving Work



13.4 Paving – Work in Progress

Purpose:

This layout shows the work activity area within the longer project area (Limits of Construction). It is important to focus on the work activity area and the current conditions to ensure that the most applicable signage and devices are used and that the selected layout accurately reflects the work.

Standard:

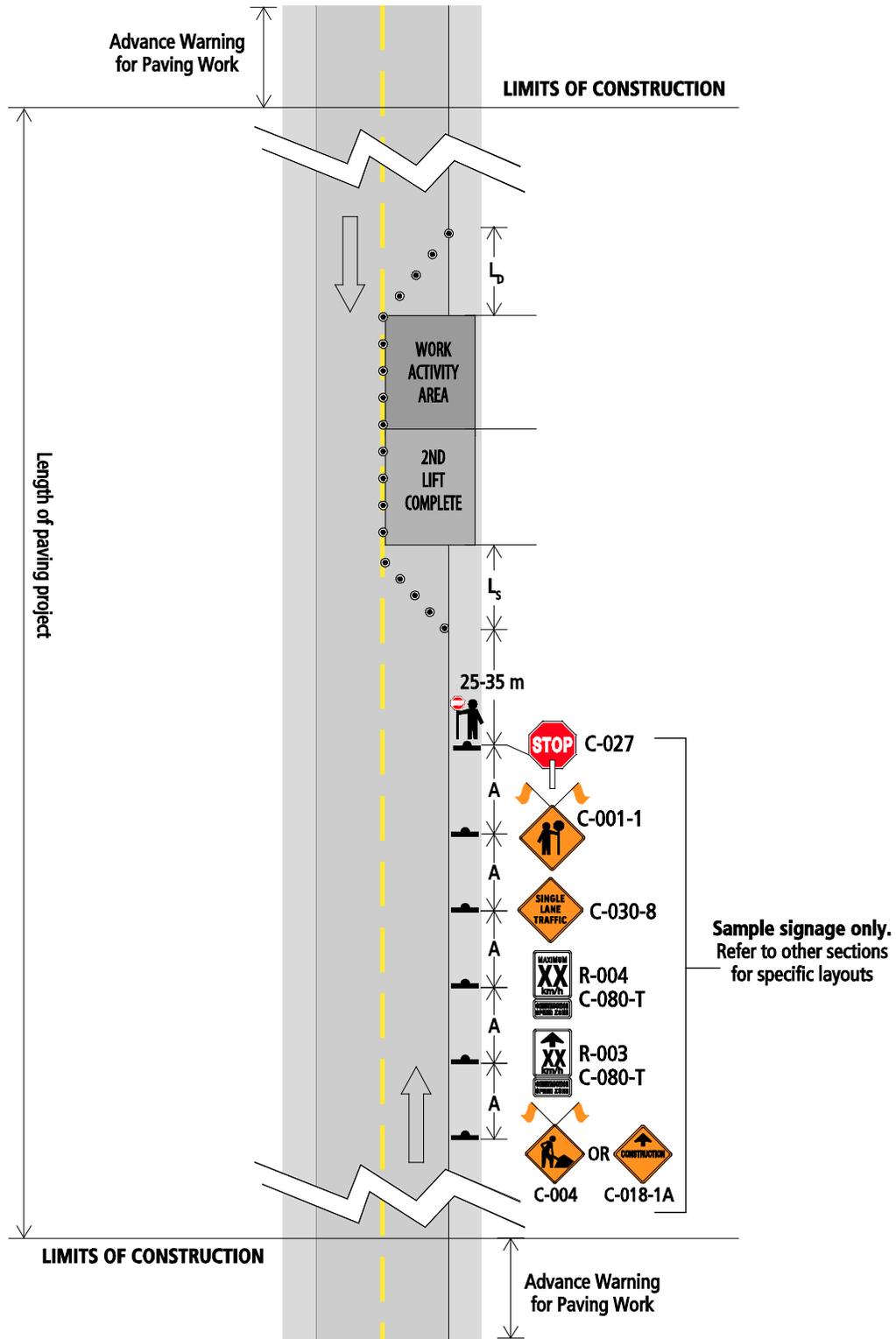
The most appropriate layout should be applied to the work activity area, based on the highway type and traffic control required. The layout options include, but are not limited to, those listed below.

Type of Work Area	Traffic Control Layouts
Two-Lane, Two-Way Single Lane Alternating	Section 7.8 <i>Lane Closure with TCPs – Single Lane Alternating</i>
Pilot Car Operation	Section 7.16 <i>Pilot Cars</i> Section 13.6 <i>Seal Coating in Progress</i>
Multilane Roadway Lane Closure	Section 8.6 <i>Right Lane Closed</i> Section 8.7 <i>Left Lane Closed</i> Section 8.8 <i>Centre Lane Closure (< 60 km/h)</i> Section 9.7 <i>Left Lane Closed</i> Section 9.9 <i>Centre Lane Closure (≥ 70 km/h)</i> Section 9.10 <i>Double Lane Closure</i>
Lane Shift	Section 8.10 <i>Centreline Crossover</i> Section 8.14 <i>Passing/Climbing Lanes – Lane Shift</i> Section 9.11 <i>Median Crossover</i>
Intersection	Section 11.9 <i>Left/Right Lane Closure within Intersection – Multilane Intersection</i> Section 11.10 <i>Right Lane Closure with Right-Turn Lane (Near Side) – Channelized Right Turn Open – Multilane Intersection</i> Section 11.11 <i>Two Lanes Closed (Near Side) – Multilane Intersection</i> Section 11.12 <i>Two-Lane Closure – Multilane Intersection</i>

Guidance and Options:

- The Guidance and Options for the selected layout apply.

Figure 13.4: Paving – Work in Progress



13.5 Paving – Work Not in Progress

Purpose:

This layout shows a typical setup for a paving project that is under way—but for which workers are not currently present (e.g., at night or on a weekend)—and that has site conditions of which drivers should be advised through appropriate signage (e.g., No Centreline, Bump, Low or Soft Shoulder, No Passing, etc.) These signs may also be used when paving is in progress.

Standard:

Signs commonly required on inactive or dormant paving projects include, but are not limited to:

- Construction Ahead C-018-1A sign with Construction Speed Zone C-080-T tab for long-duration work.
- Paving Next XX km C-008-1 signs in advance of and throughout the work activity area at 5-kilometre intervals.
- Low Shoulder on Left/Right C-013-LR sign where shoulder is lower than road surface.
- Uneven Pavement on Left/Right C-010-LR sign where there is uneven pavement on either side of the travel lane (excluding shoulders).
- Bump or Rough Roadway Ahead C-017 sign where sharp road surface changes are sufficiently abrupt.
- Uneven Pavement Ends C-016 sign at the end of an uneven section of pavement.

Other signs that help to identify certain conditions or activities on dormant sites include:

- | | |
|---------------------------------|---------|
| • Soft Shoulder | C-012 |
| • Loose Gravel | C-015 |
| • Pavement Ends | C-149 |
| • Use Headlights – Extreme Dust | C-185-3 |

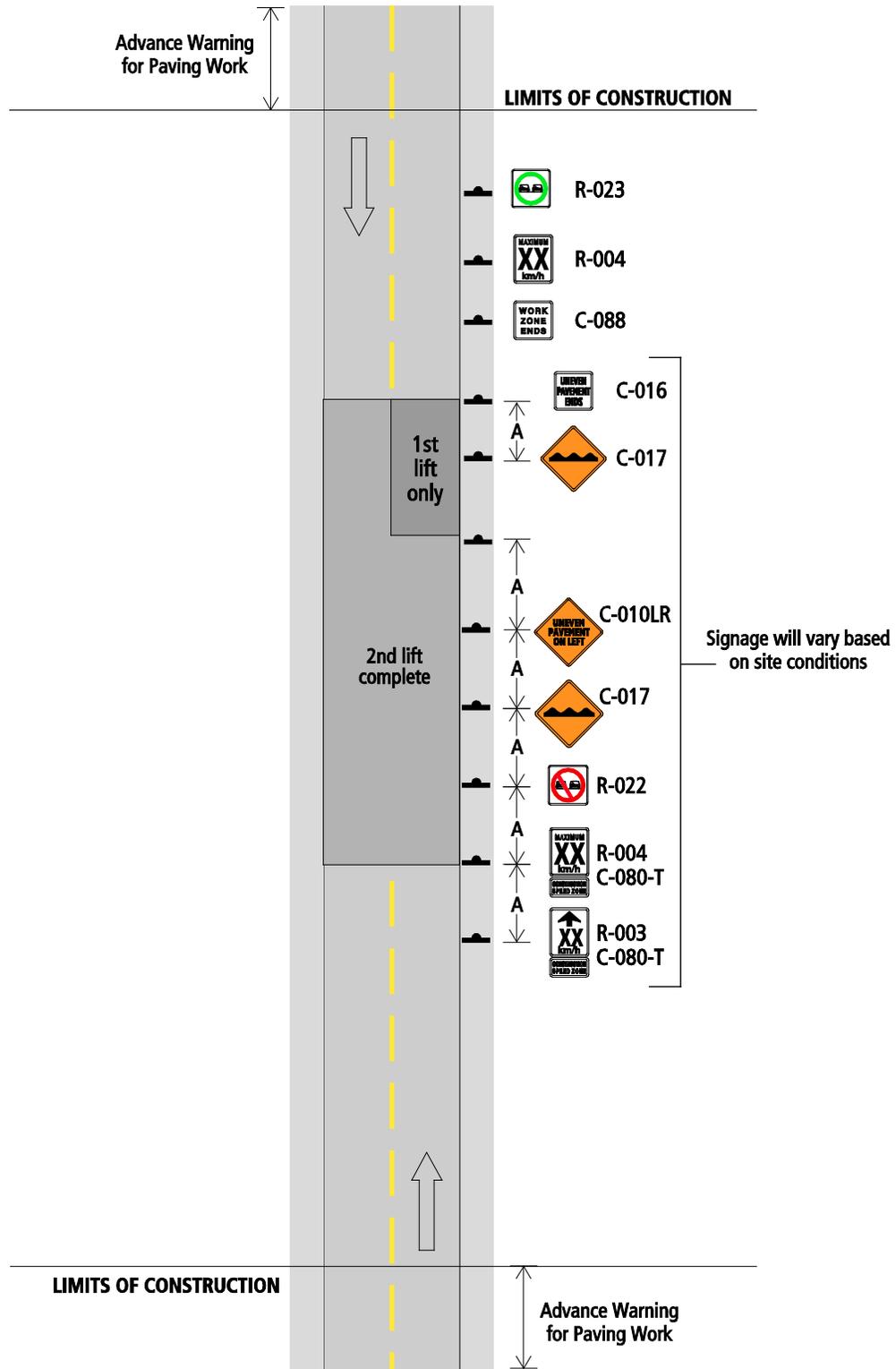
Guidance:

- When the roadway and shoulders are clear of machinery and obstructions, and the condition of the unfinished roadway is such that traffic can proceed safely without the assistance of TCPs or a pilot car:
 - All non-applicable signs should be removed or covered.
 - The Paving Ahead Next XX km C-008-1 sign with the appropriate C-008-OL distance overlay should be repeated every 5 kilometers, showing a decreasing distance to the end of the project.

Options:

- Additional signage may be required throughout the work area and the project area, and repeated as necessary (see [Appendix B: Standard Construction Signs](#)).

Figure 13.5: Paving – Work Not in Progress



13.6 Seal Coating in Progress

Purpose:

This layout shows the typical setup for an active seal coating project on a two-lane, two-way roadway. Seal coating projects can involve a long work activity area so a pilot car operation is often used with a single lane alternating setup to guide traffic through the work zone.

Standard:

- A Seal Coating – Loose Gravel Next XX km C-008-2 shall be positioned in advance of the work activity area.
- If TCPs are used, a Traffic Control Person Ahead C-001-1 sign is required.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.
- Overhead lighting shall illuminate each TCP location at night.
- A Follow Pilot Car C-049 shall be positioned on the shoulder.
- The double-sided Pilot Car (frontward-facing) and Pilot Car Do Not Pass (rearward-facing) C-048-1-DS sign or the Pilot Car C-048-2 overhead sign are required on the pilot car so that its signage is visible from both directions.
- A Work Zone Ends C-088 sign, followed by a Maximum Speed R-004 sign, shall be positioned the end of the work activity area.
- The Seal Coating – Loose Gravel Next X km C-008-2 sign should be repeated every 5 kilometers, showing a decreasing distance to the end of the project.

Guidance:

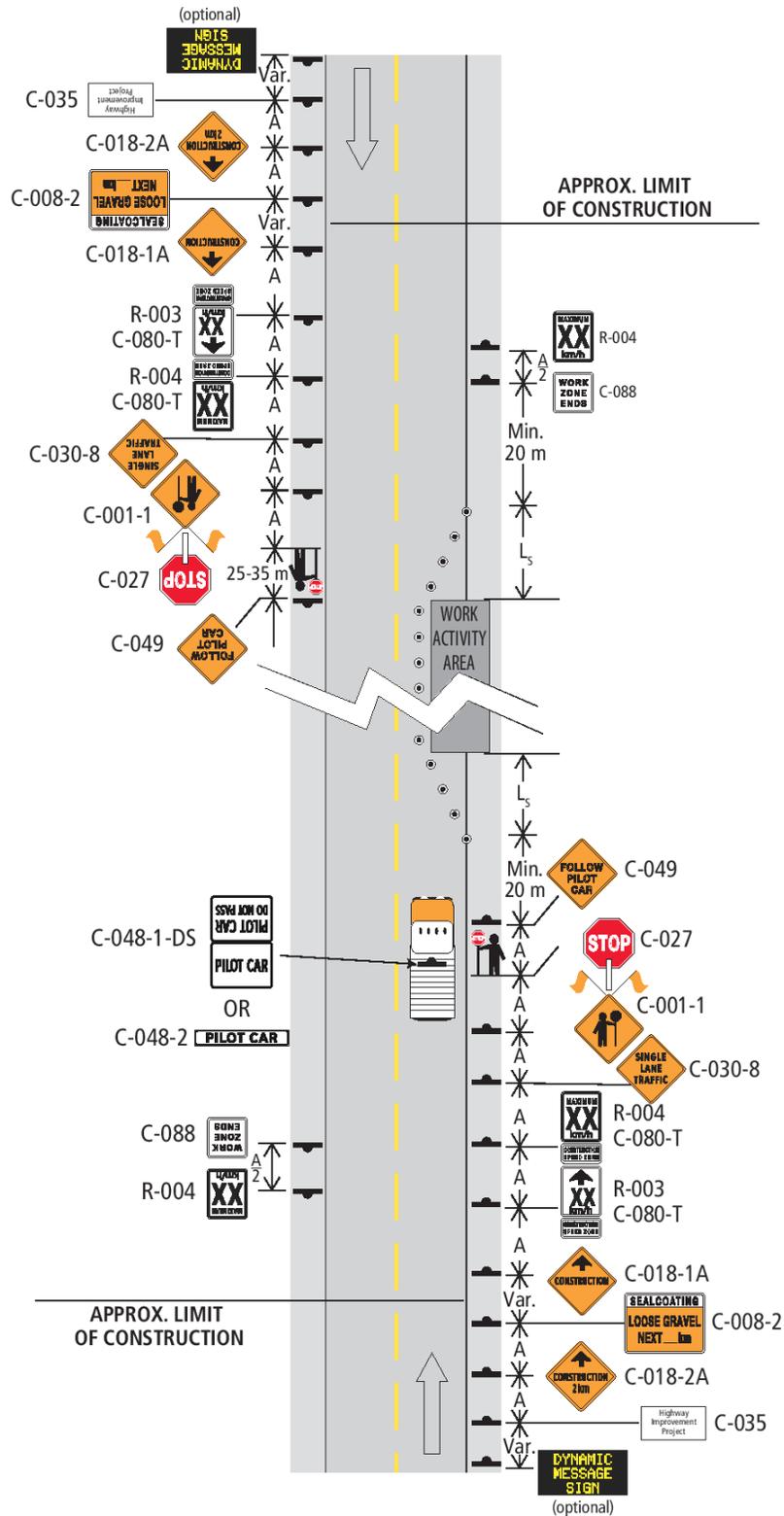
- The pilot car operator and TCPs should be in radio contact.

Options:

- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- Additional signage may be required throughout the advance warning area and repeated as necessary (see [Appendix B: Standard Construction Signs](#)), including but not limited to:

- Soft Shoulder	C-012
- Fresh Oil	C-014
- Loose Gravel	C-015
- Single Lane Traffic	C-030-8
- Follow Pilot Car	C-049
- Sweeper Working	C-076
- Pavement Ends	C-149
- Truck Crossing/Entering Highway	C-172-R
- Use Headlights – Extreme Dust	C-185-3

Figure 13.6: Seal Coating in Progress



13.7 Installing and Removing Reflectors

Purpose:

This layout shows two potential setups—depending on the shoulder width—for the installation of temporary and permanent reflectors on a hard surface and the removal of reflectors from such a surface:

- [*Figure 13.7 A – Insufficient Shoulder Width*](#)
- [*Figure 13.7 B – Sufficient Shoulder Width*](#)

These setups are appropriate for intermittently-moving, short-duration work during daylight hours on a low-speed, low-volume, two-lane, two-way roadway.

Night work and roadways with higher speeds and volumes require more complex setups. Refer to these sections for appropriate traffic control layouts:

- [*Section 7: Traffic Control Layouts – Two-Lane, Two-Way Roadways*](#)
- [*Section 8: Traffic Control Layouts – Multilane Undivided Roadways*](#)
- [*Section 9: Traffic Control Layouts – Multilane Divided Roadways*](#)
- [*Section 10: Traffic Control Layouts – Mobile Work*](#)

Standard:

For areas with **insufficient shoulder width**:

- A shadow vehicle shall be used to protect workers and provide advance warning to approaching motorists.
- The work and shadow vehicles shall both display a rear-mounted Slow Moving Vehicle C-036 sign, a flashing arrow board (FAB) in bar mode, and 360-degree flashing lights and 4-way flashers.
- Traffic shall be regulated with a single lane alternating setup, either by using a Yield to Oncoming Traffic R-056-1 sign on the back of the shadow vehicle or by using Traffic Control Persons.
- A Slow Vehicle Next XX km C-044 sign or a Truck Stopped on Road Next 2 km C-038 sign shall be used in advance of the work and identified with flags. It shall be moved as the work progresses so that the work vehicle remains within the distance indicated on the sign.
- If 5 or more vehicles are queued or if potential passing hazards are of concern, the work and shadow vehicles shall move off the road to allow traffic to pass.
- If passing traffic is an ongoing concern, other traffic control methods and layouts shall be used.
- The Slow Vehicle Next X km C-044 sign shall be moved as the work progresses so that the work vehicle remains within the distance indicated on the sign.

For areas with **sufficient shoulder width**:

- The work and shadow vehicles shall both display a rear-mounted Slow Moving Vehicle C-036 sign, a flashing arrow board (FAB) in bar mode, and 360-degree flashing lights and 4-way flashers.
- Traffic may be permitted to pass on the shoulder if a 3.5-metre distance can be maintained between the work/shadow vehicle and the edge of the paved shoulder.
- If traffic is permitted to pass on the shoulder side, a Pass This Side C-042-R (right arrow) sign shall be displayed on the rear of the shadow vehicle.
- A Slow Vehicle Next XX km C-044 sign shall be used in advance of the work and identified with flags. This sign shall be moved as the work progresses so that the work vehicle remains within the distance indicated on the signs.

Guidance:

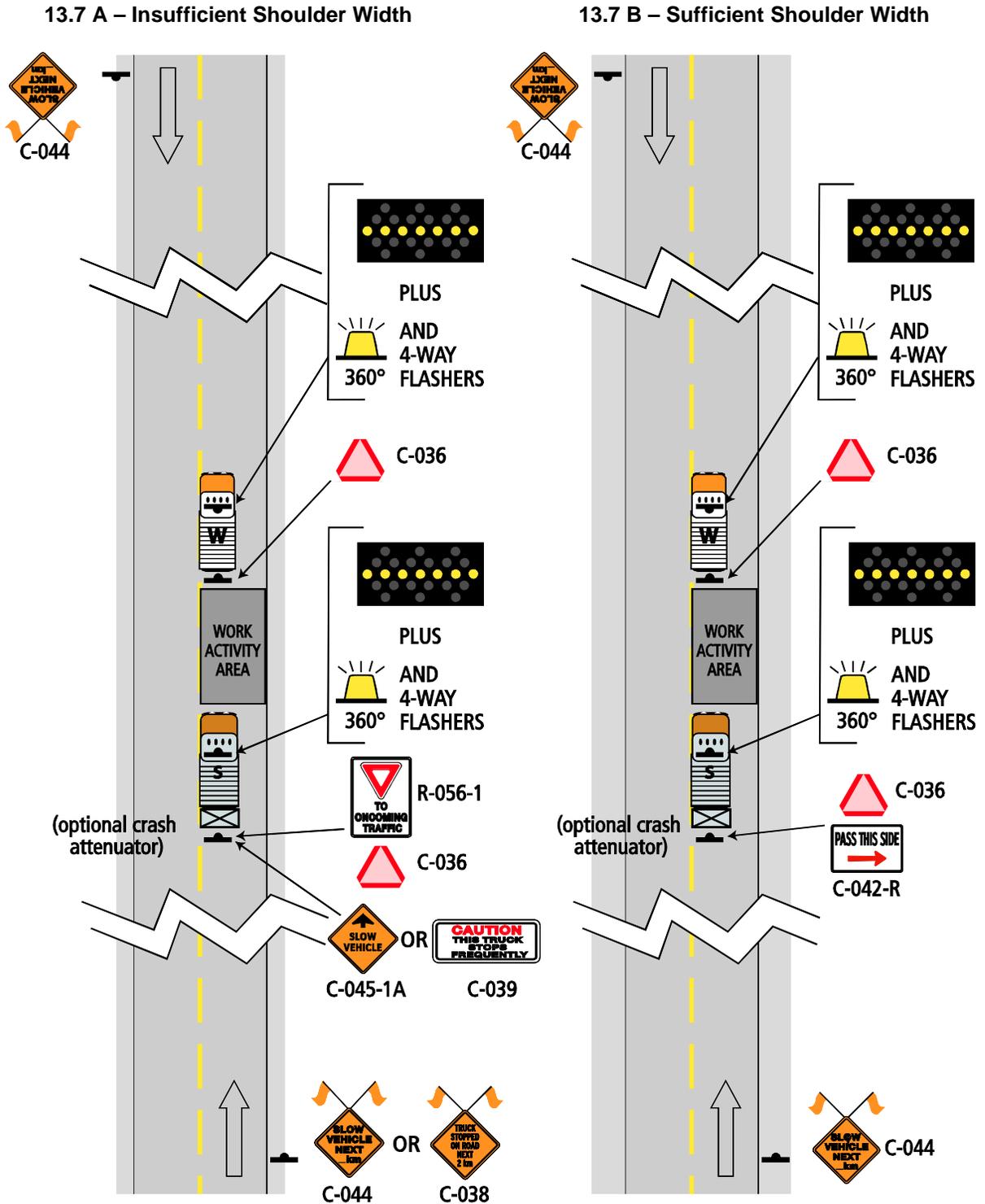
- The distance shown on Slow Vehicle Next X km C-044 signs should not exceed 8 kilometres.
- All temporary signs should be removed or covered when work is not in progress.
- Work vehicles may travel at posted speeds when work is not in progress.

Options:

- The Road Authority may require that the shadow vehicle have a rear-mounted Slow Vehicle(s) Ahead C-045 sign or other appropriate sign.
- A dynamic message sign (DMS) displaying the appropriate directional text and arrow may be used instead of the Pass This Side C-042-R sign.

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Figure 13.7: Installing and Removing Reflectors



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PART B – TRAFFIC CONTROL

Section 14: Traffic Control Layouts – Pavement Marking

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PART B – TRAFFIC CONTROL

Section 14: Traffic Control Layouts – Pavement Marking

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

14.1 General Information - Pavement Marking

1. For the purposes of this Manual, pavement marking is considered to be either conventional or quick-dry pavement marking:
 - **Conventional Pavement Marking:** When the drying time is 5 minutes or more after the passing of the paint truck and shadow vehicle, and where vehicles could track paint onto the roadway upon contact with it, it is necessary to implement advance warning signage and protection of the painted area until the paint is set. This involves using signs, cones, barricades, closures, and/or other traffic control devices.
 - **Quick-Dry Pavement Marking:** Quick-dry painting is a continuously-moving operation and differs from conventional longitudinal line painting by using dynamic message signs (DMS) on shadow vehicles to inform drivers that painting is in progress along the roadway. When the drying time is 90 seconds or less after the passing of the paint truck and shadow vehicle, the paint is set to a point where vehicles will not track paint onto the roadway upon contact with it.
2. Note that these two terms refer to the set time of the paint, not to two different applications. Paint that sets more slowly can typically be protected until it dries, while paint that sets more quickly may not require the same protection. For traffic control purposes, the determining factor is whether or not the paint will be tracked onto the roadway if vehicles come into contact with the freshly painted line.
3. The set time of the paint is determined by the composition of the paint and the condition and temperature of the surface and the air. Some paints that dry quickly under ideal conditions may no longer be “quick-dry” paints when used in less than ideal conditions. If the paint’s set time is prolonged for any reason, it can be treated as “conventional” paint that requires advance warning signage and protection of the freshly painted surface.

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- All static signs and dynamic message signs (DMS) shall be visible to drivers when painting is in progress.
- All work vehicles require **two** 360-degree flashing lights when painting the centreline or working at night.
- Constant communication is required between all Vehicle Operators.
- Stationary construction signs and cones are not required for quick-dry marking.
- **Escort Vehicle Requirements:**
 - 360-degree flashing light and 4-way flashers
 - caution pattern or arrow on sequential arrow board
 - dynamic message sign (DMS)
 - Slow Moving Vehicle C-036 sign
 - Caution – Paint Spray Truck Ahead C-043 sign
 - Pass This Side C-042-L sign
- **Paint Truck Requirements:**
 - 360-degree flashing light and 4-way flashers
 - caution pattern or arrow on sequential arrow board
 - Wet Paint C-037-1 sign
 - Slow Moving Vehicle C-036 sign
 - Wet Paint – Keep Off C-037-2 sign
- **Shadow Vehicle #1 Requirements:**
 - 360-degree flashing light and 4-way flashers
 - caution pattern or arrow on sequential arrow board
 - dynamic message sign (DMS)
 - Slow Moving Vehicle C-036 sign
 - Wet Paint – Keep Off C-037-2 sign
 - truck-mounted crash attenuator for speeds ≥ 70 km/h
- **Shadow Vehicle #2 Requirements:**
 - 360-degree flashing light and 4-way flashers
 - caution pattern or arrow on sequential arrow board
 - dynamic message sign (DMS)
 - Slow Moving Vehicle C-036 sign

Guidance:

- None at this time.

Options:

- A crash attenuator may be added to Shadow Vehicle #2.

14.2 Quick-Dry Long-Line Marking – Two-Lane, Two-Way Roadway – Short and Long Duration

Purpose:

This layout shows the typical setup for quick-dry long-line marking on a two-lane, two-way roadway.

Standard:

Two-Lane, Two-Way Roadway – Passing NOT Permitted:

Escort Operations:

- The Escort Vehicle is positioned 200 to 500 meters in front of the Paint Truck, depending on traffic volumes and sight conditions.
- The DMS display shall be visible to oncoming traffic. It may be:
 - caution pattern
 - Line Painting ... Ahead
 - Line Painting ... Slow Down
- The Escort Vehicle Operator shall have a STOP/SLOW TCP C-027 paddle for emergencies.

Shadow Vehicle #1 Operations:

- Shadow Vehicle #1 follows the Paint Truck at a distance of 200 to 400 metres, depending on sight distances and paint drying times.
- The DMS shall display one these messages:
 - Line Painting ... No Passing
 - Wet Paint ... No Passing

Shadow Vehicle #2 Operations:

- Shadow Vehicle #2 follows the paint operation at a distance of approximately 1 kilometre, depending on sight distances, travelling on the shoulder where possible.
- The DMS messaging is specified by the foreman, and may be:
 - caution pattern
 - Line Painting ... Ahead
 - Line Painting ... 1 km Ahead
 - Line Painting ... Next 1 km
 - Wet Paint ... Next 1 km

Two-Lane, Two-Way Roadway – Controlled Passing Opportunities:

Escort Vehicle Operations:

- The Escort Vehicle should be stopped as close as possible to the centreline—but not straddling it—and have good visibility to oncoming traffic.
- When controlled passing is not occurring, the Escort Vehicle Operator shall display these messages on the DMS:
 - Line Painting ... Ahead
 - Line Painting ... Slow Down
- Upon notification, the Escort Vehicle Operator shall evaluate sight distances and traffic conditions before initiating controlled passing.
- If conditions are satisfactory for controlled passing, the Escort Vehicle Operator shall display STOP on the DMS.
- The Escort Vehicle Operator shall ensure that all vehicles have complied with the STOP message before allowing the paint operation to be passed.
- The Escort Vehicle Operator shall continue to hold stopped traffic until the last vehicle in the passing procession (as described by Shadow Vehicle #1 Operator) has cleared the work zone.
- The Escort Vehicle Operator shall notify the Shadow Vehicle #1 Operator that passing is complete.

Shadow Vehicle #1 Operations:

- When passing is required, the Shadow Vehicle #1 Operator shall communicate a passing request to the Escort Vehicle Operator and wait for notification that oncoming traffic is stopped.
- When it is safe to pass, the DMS display shall be changed to:
 - Line Painting ... Pass on Left
 - Wet Paint ... Pass on Left
- The Shadow Vehicle #1 Operator shall provide a description of the last vehicle in the passing procession to the Escort Vehicle Operator.
- Once the last vehicle has passed, the DMS display shall be changed to:
 - Line Painting ... No Passing
 - Wet Paint ... No Passing

Shadow Vehicle #2 Operations:

- On a two-lane roadway, Shadow Vehicle #2 assumes the buffer position.
- On a highway with a 3-metre shoulder, Shadow Vehicle #2 shall be driven along the right shoulder—not straddling the edge line—and follow the Paint Truck at a distance of approximately 1 kilometre.
- If the shoulder is too narrow, Shadow Vehicle #2 shall travel leap-frog fashion from approach to approach, parking parallel to the highway when stopping, keeping the signs and DMS visible to approaching traffic, and maintaining the approximate 1 kilometre distance behind the Paint Truck.
- The DMS messaging is specified by the foreman, and may be:
 - caution pattern
 - Line Painting ... Ahead/Next 1 km
 - Wet Painting ... 1 km Ahead/ Next 1 km

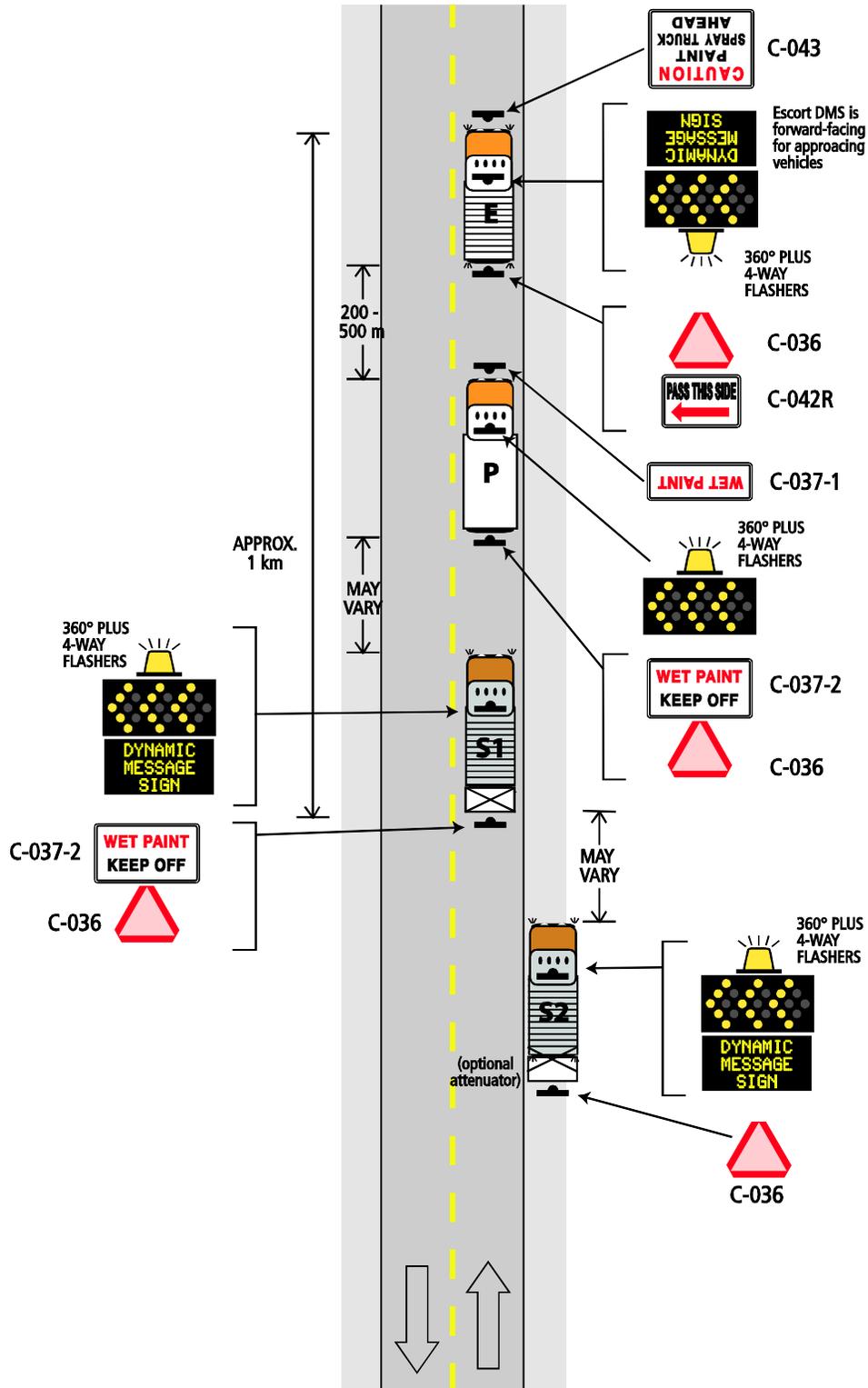
Guidance:

- The separation distance between the Paint Truck and Shadow Vehicle #1 should be determined by the set time (track-free time) of the pavement-marking paint.
- Sight distances and traffic volumes should be taken into consideration when choosing areas for controlled passing.
- Controlled passing of the painting operation requires effective communication and coordinated traffic control between the Escort Vehicle and Shadow Vehicle #1 Operators.
- Ideally, traffic will pass Shadow Vehicle #1 and the Paint Truck at the same time.
- When traffic volumes are excessive and the passing procession is large, the Paint Truck may have to stop the painting operation until the procession has passed completely. This will also help to reduce the required length of the passing zone.
- When a wide load or emergency vehicle is approaching the painting operation, all Vehicle Operators should be alerted so that they may take appropriate action.

Options:

- None at this time.

Figure 14.2: Quick-Dry Long-Line Marking – Two-Lane, Two-Way Roadway – Short and Long Duration



14.3 Quick-Dry Long-Line Marking – Right Lane – Multilane Roadway – Short and Long Duration

Purpose:

This layout shows the typical setup for quick-dry long-line marking on the right lane of a divided or undivided multilane roadway.

Standard:**Shadow Vehicle #1 Operations:**

- Shadow Vehicle #1 shall travel in the same lane as the Paint Truck, following at a distance of 50 to 200 metres, depending on sight distance and traffic volumes. (It may have to be closer to the Paint Truck to prevent vehicles from entering the gap between the two vehicles, with consideration given to the amount of set time required for the paint.)
- The DMS messaging may be:
 - left chevron
 - Wet Paint ... Keep Left
 - Line Painting ... Keep Left

Shadow Vehicle #2 Operations:

- Shadow Vehicle #2 shall travel on the right shoulder—not straddling the edge line—and follow the Paint Truck at a distance of approximately 1 kilometre.
- The DMS messaging is specified by the foreman, and may be:
 - left chevron
 - Line Painting ... Keep Left
 - Line Painting ... Merge Left

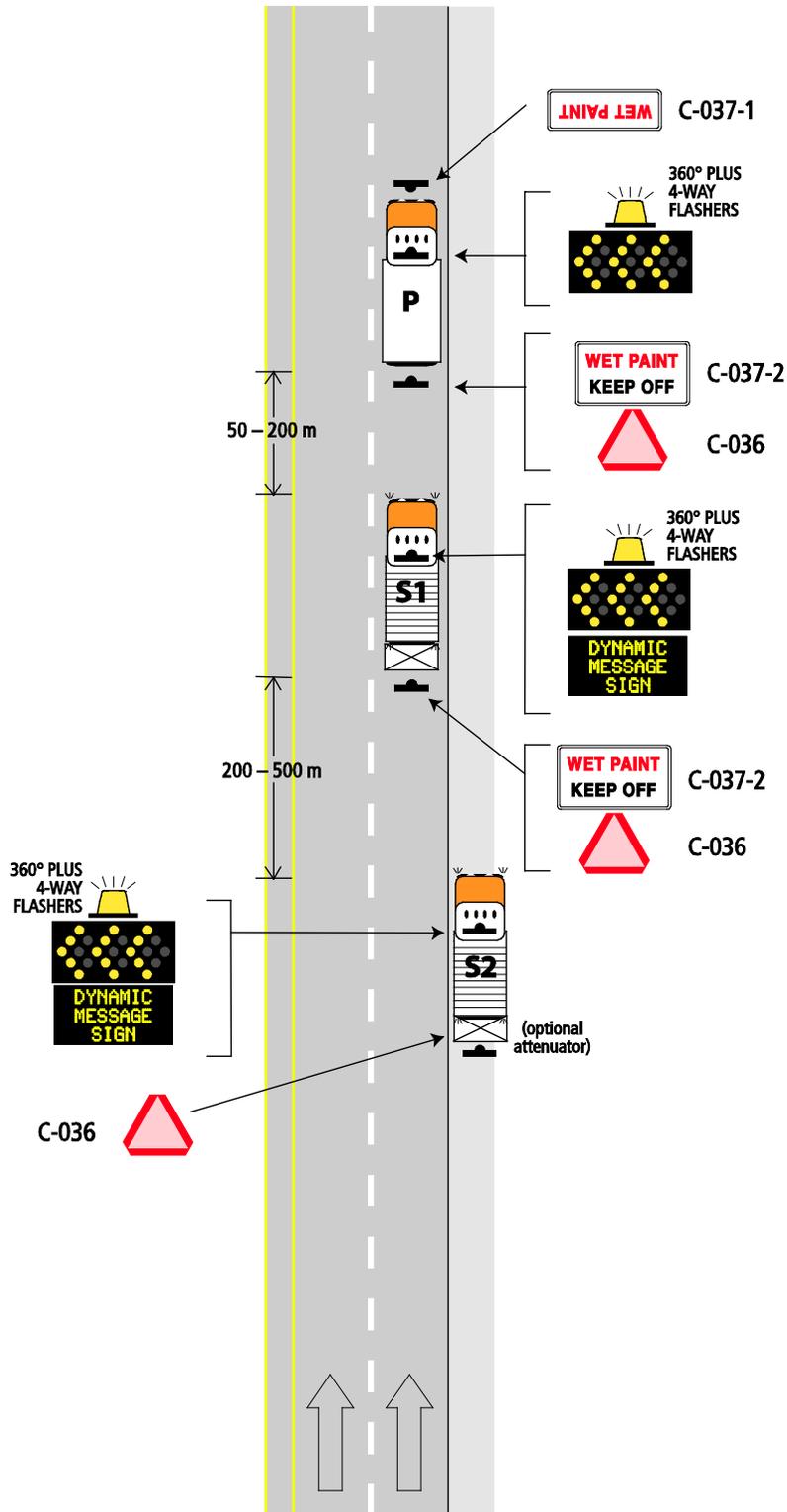
Guidance:

- The distance between the Paint Truck and Shadow Vehicle #1 should be determined by the set time (track-free time) of the pavement-marking paint.

Options:

- When traffic volumes are high, a third shadow vehicle may be positioned between the Paint Truck and Shadow Vehicle #1. It should follow the Paint Truck at a distance of 50 to 200 metres, followed by Shadow Vehicle #1 at a distance of 200 to 300 metres. The DMS messaging on the third shadow vehicle may be:
 - Wet Paint ... Keep Left
 - Line Painting ... Keep Left
- The third shadow vehicle may be the Escort Vehicle with the DMS repositioned to be rear-facing so that the message is visible to rear-approaching traffic.

Figure 14.3: Quick-Dry Long-Line Marking – Right Lane – Multilane Roadway – Short and Long Duration



14.4 Quick-Dry Long-Line Marking – Left Lane – Multilane Roadway (Median ≥ 1 m) – Short and Long Duration

Purpose:

This layout shows the typical setup for quick-dry long-line marking on the left lane of a multilane roadway when the centre median is ≥ 1 metre wide.

Standard:

Shadow Vehicle #1 Operations:

- Shadow Vehicle #1 shall travel in the same lane as the Paint Truck, following at a distance of 50 to 200 metres, depending on sight distance and traffic volumes. (It may have to be closer to the Paint Truck to prevent vehicles from entering the gap between the two vehicles, with consideration given to the amount of set time required for the paint.)
- The DMS messaging may be:
 - right chevron
 - Wet Paint ... Keep Right
 - Line Painting ... Keep Right

Shadow Vehicle #2 Operations:

- Shadow Vehicle #2 shall travel as far left as practicable, following the Paint Truck at a distance of approximately 1 kilometre.
- The DMS messaging is specified by the foreman, and may be:
 - right chevron
 - Line Painting ... Keep Right
 - Line Painting ... Merge Right

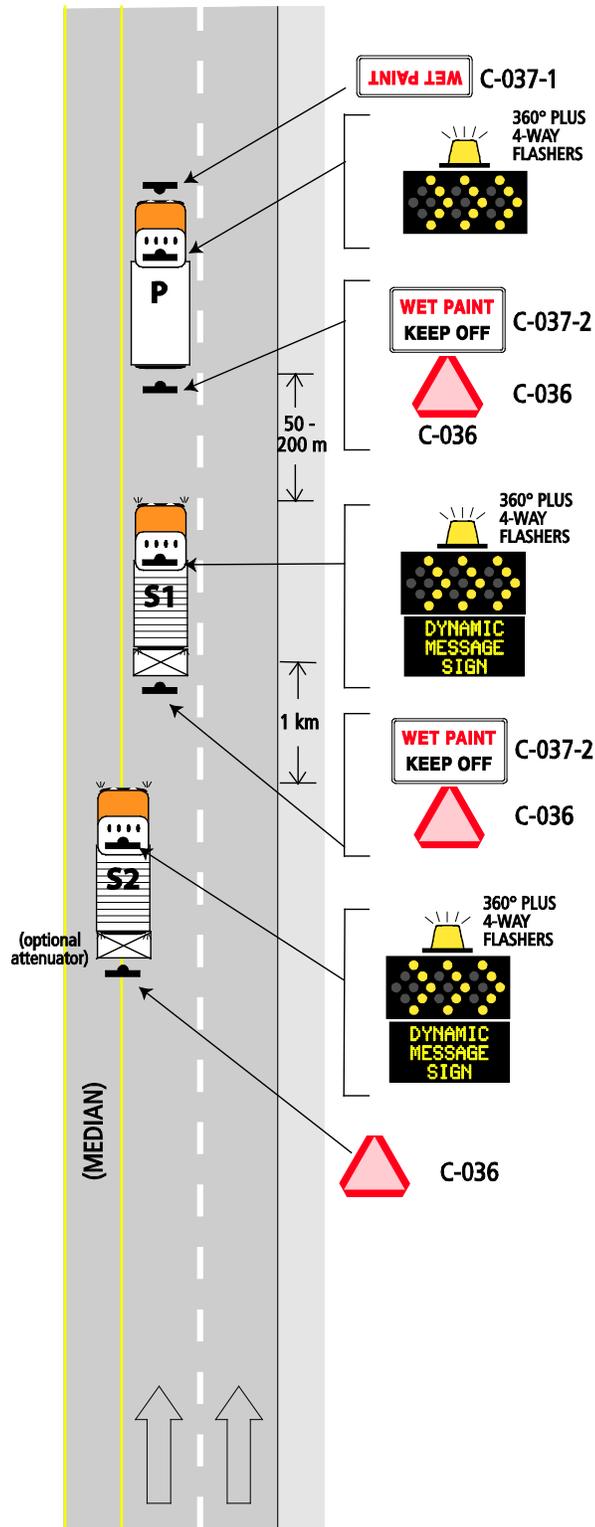
Guidance:

- The distance between the Paint Truck and Shadow Vehicle #1 should be determined by the set time (track-free time) of the pavement-marking paint.

Options:

- When traffic volumes are high, a third shadow vehicle may be positioned between the Paint Truck and Shadow Vehicle #1. It should follow the Paint Truck at a distance of 50 to 200 metres, followed by Shadow Vehicle #1 at a distance of 200 to 300 metres. The DMS on the third shadow vehicle may display one of these messages:
 - Wet Paint ... Keep Right
 - Line Painting ... Keep Right
- The third shadow vehicle may be the Escort Vehicle with the DMS repositioned to be rear facing so that the message is visible to rear-approaching traffic.

**Figure 14.4 Quick-Dry Long-Line Marking – Left Lane – Multilane Roadway (Median ≥ 1 m)
– Short and Long Duration**



14.5 Quick-Dry Long-Line Marking – Left Lane – Multilane Roadway (Median < 1 m, Right Shoulder ≥ 2 m) – Short and Long Duration

Purpose:

This layout shows the typical setup for quick-dry long-line marking on the left lane of a multilane roadway when the centre median width < 1 metre wide and the right shoulder is ≥ 2 metres wide.

Standard:

Shadow Vehicle #1 Operations:

- Shadow Vehicle #1 shall travel in the same lane as the Paint Truck, following at a distance of 50 to 200 metres, depending on sight distance and traffic volumes. (It may have to be closer to the Paint Truck to prevent vehicles from entering the gap between the two vehicles, with consideration given to the amount of set time required for the paint.)
- The DMS messaging may be:
 - right chevron
 - Wet Paint ... Keep Right
 - Line Painting ... Keep Right

Shadow Vehicle #2 Operations:

- Shadow Vehicle #2 shall travel as far right as practicable on the right shoulder, following the Paint Truck at a distance not exceeding 1 kilometre.
- The DMS messaging is specified by the foreman, and may be:
 - Caution mode
 - Line Painting ... Ahead
 - Keep Right

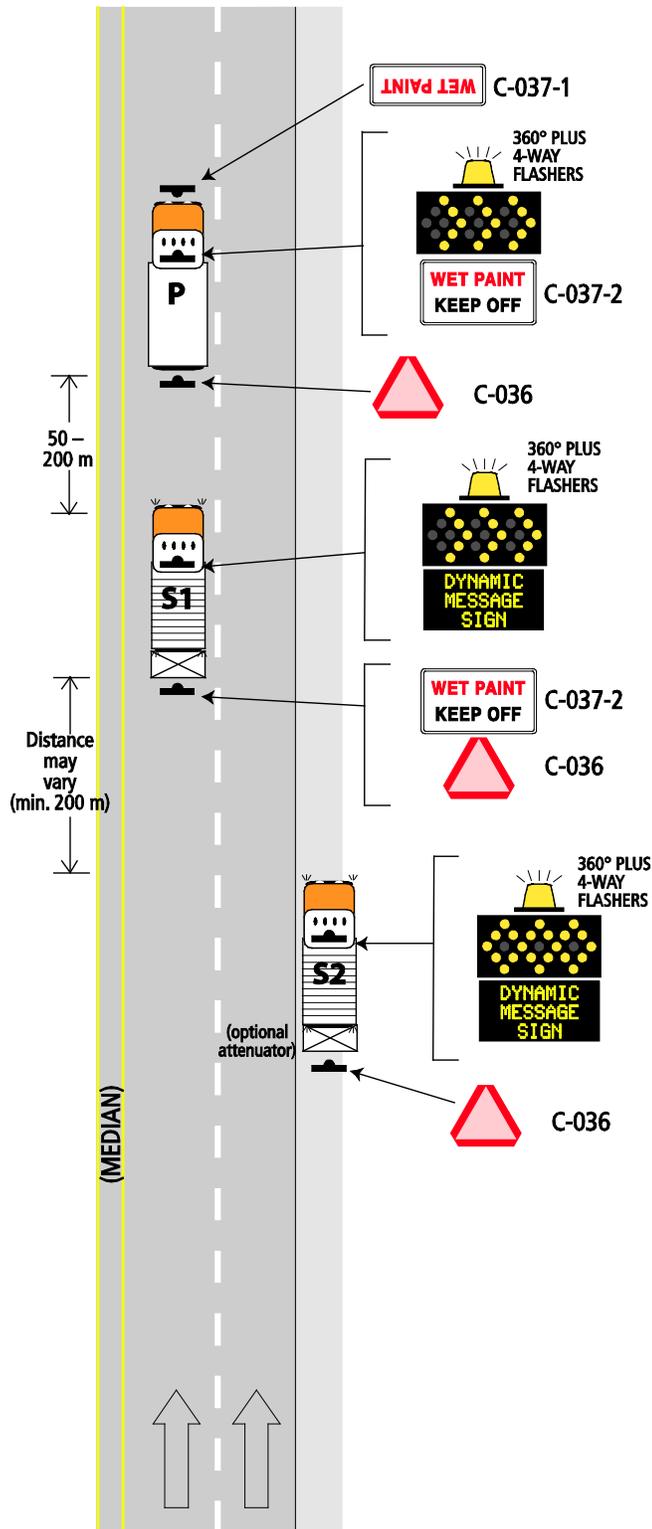
Guidance:

- The distance between the Paint Truck and Shadow Vehicle #1 should be determined by the set time (track-free time) of the pavement-marking paint.

Options:

- When traffic volumes are high, a third shadow vehicle may be positioned between the Paint Truck and Shadow Vehicle #1. It should follow the Paint Truck at a distance of 50 to 200 metres, followed by Shadow Vehicle #1 at a distance of 200 to 300 metres. The DMS on the third shadow vehicle may display one of these messages:
 - Wet Paint ... Keep Right
 - Line Painting ... Keep Right
- The third shadow vehicle may be the Escort Vehicle with the DMS repositioned to be rear-facing so that the message is visible to rear-approaching traffic.

**Figure 14.5: Quick-Dry Long-Line Marking – Left Lane – Multilane Roadway
(Median < 1 m, Right Shoulder ≥ 2 m) – Short and Long Duration**



14.6 Quick-Dry Long-Line Marking – Left Lane – Multilane Roadway (Median < 1 m, Right Shoulder < 2 m) – Short and Long Duration

Purpose:

This layout shows the typical setup for quick-dry long-line marking on the left lane of a multilane roadway when the centre median is < 1 metre wide and the right shoulder is < 2 metres wide.

Standard:

Shadow Vehicle #1 Operations:

- Shadow Vehicle #1 shall travel in the same lane as the Paint Truck, following at a distance of 50 to 200 metres, depending on sight distance and traffic volumes. (It may have to be closer to the Paint Truck to prevent vehicles from entering the gap between the two vehicles, with consideration given to the amount of set time required for the paint.)
- The DMS messaging may be:
 - Right chevron
 - Wet Paint ... Keep Right
 - Line Painting ... Keep Right

Shadow Vehicle #2 Operations:

- Shadow Vehicle #2 shall be outside the travel lane, either in the median or on the shoulder, at a distance not exceeding 1 kilometre.
- The DMS messaging is specified by the foreman, and may be:
 - Right chevron
 - Line Painting ... Ahead
 - Keep Right

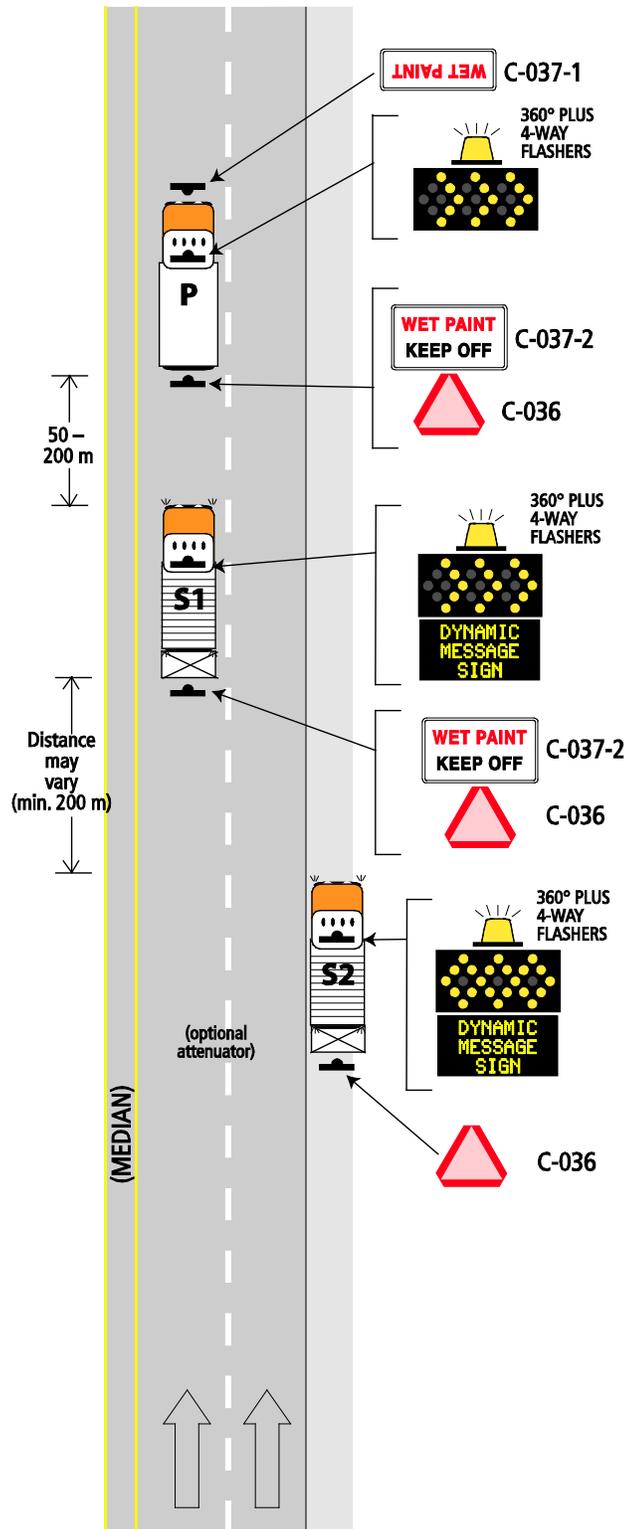
Guidance:

- The distance between the Paint Truck and Shadow Vehicle #1 should be determined by the set time (track-free time) of the pavement-marking paint.

Options:

- When traffic volumes are high, a third shadow vehicle may be positioned between the Paint Truck and Shadow Vehicle #1. It should follow the Paint Truck at a distance of 50 to 200 metres, followed by Shadow Vehicle #1 at a distance of 200 to 300 metres. The DMS on the third shadow vehicle may display one of these messages:
 - Wet Paint ... Keep Right
 - Line Painting ... Keep Right
- The third shadow vehicle may be the Escort Vehicle with the DMS repositioned to be rear-facing so that the message is visible to rear-approaching traffic.

**Figure 14.6: Quick-Dry Long-Line Marking – Left Lane – Multilane Roadway
(Median < 1 m, Right Shoulder < 2 m) – Short and Long Duration**



14.7 Conventional Long-Line Centreline and White Line Marking – Two-Lane, Two-Way Roadway – Short and Long Duration

Purpose:

This layout shows typical setups for two kinds of conventional long-line pavement marking along a two-lane, two-way roadway:

- [Figure 14.7 A – Centreline Marking](#)
- [Figure 14.7 B – White Line Marking \(Shoulder or Edge\)](#)

Standard:

- Road Marking in Progress C-041-xx signs shall be displayed at each end of the work activity area. The distance between the two signs shall not exceed 10 kilometres.
- The Slow Vehicles Ahead C-045-2A sign shall be positioned after the Road Marking in Progress C-041-xx sign.
- A Caution – Paint Spray Truck Ahead C-043 sign shall be mounted on the front of the Escort Vehicle.
- Both the Paint Truck and the Escort Vehicle shall have:
 - a Pass This Side C-042-LR sign
 - a 360-degree flashing light and 4-way flashers
 - a dynamic message sign (DMS) set to alternate between flashing arrow mode and a displayed message
- Constant communication is required between all Vehicle Operators.
- For centreline marking, cones shall be placed on the centreline.
- For shoulder line marking, cones shall be placed on the white line.

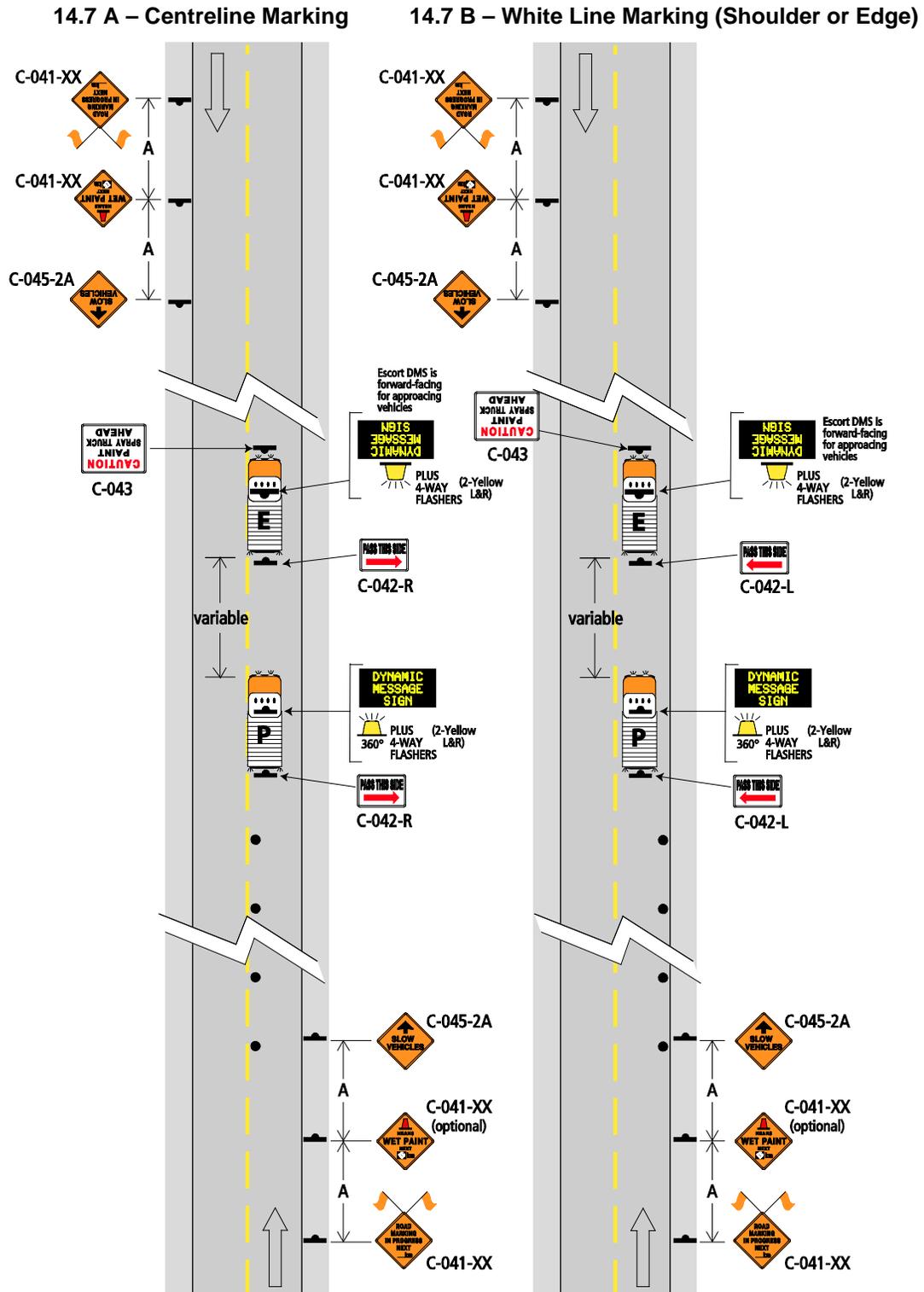
Guidance:

- If it is not practicable for drivers following the Paint Truck and Escort Vehicle to pass the operation, the Paint Truck and Escort Vehicle should pull over periodically to allow these vehicles to go around them.
- The distance between the Escort Vehicle and the Paint Truck will vary, depending on sight lines. They should be as close to each other as possible, but it may be necessary to increase the space on curved roads to provide more advance warning for approaching traffic.

Options:

- The Wet Paint side of an additional Road Marking in Progress C-041-xx sign may be used within the work area.
- Crash attenuators may be added to the Paint Truck and/or the Escort Vehicle.
- If shadow vehicles are used to supplement the operation, they shall have dynamic message signs (DMS).

Figure 14.7: Conventional Long-Line Centreline and White Line Marking – Two-Lane, Two-Way Roadway – Short and Long Duration



14.8 Conventional Long-Line Marking – Multilane Roadway – Short and Long Duration

Purpose:

This layout shows the typical setup for conventional long-line pavement marking on a multilane roadway.

The diagram shows line painting occurring in different lanes and in different directions—and the associated signing required for each setup—in order to illustrate that the painting operation may occupy either lane. The diagram does not imply a requirement to paint in both directions simultaneously.

Standard:

- Road Marking in Progress C-041-xx signs shall be displayed at each end of the work activity area. The distance between the two signs shall not exceed 10 kilometres.
- For short-duration work, a Crew Working Ahead C-004 sign is required.
- For long-duration work, a Construction Ahead C-018-1A sign is required.
- A Left/Right Lane Closed Ahead C-130-L/R sign with a C-130-T distance tab is required in advance of a second Left/Right Lane Closed Ahead C-130-L/R sign.
- Both the Paint Truck and the Shadow Vehicle require two 360-degree flashing lights when painting the centreline or working at night.
- Cones are required along all painted lines—on the centreline for centreline marking and on the white line for shoulder line marking.
- Dynamic message signs (DMS) shall be used on the Paint Truck and the Shadow Vehicle, with the arrow direction indicating the direction of travel and the side on which vehicles are to pass the operation.
- The taper shall be delineated to prevent vehicles from driving in the working lane or pulling in behind the Paint Truck.
- A flashing arrow board (FAB) is required if the speed limit is ≥ 70 km/h.
- Constant communication is required between all Vehicle Operators.

Guidance:

- Typical spacing between the Paint Truck and the Shadow Vehicle is 100 to 200 metres.

Options:

- If the speed limit is ≤ 60 km/h, a Lane Closure Arrow C-053 sign may replace the flashing arrow board (FAB) in the lane taper.
- The dynamic message signs (DMS) on top of the Paint Truck and Shadow Vehicle may be replaced with flashing arrow boards (FABs).

14.9 Left-Turn Arrow Marking – Short and Long Duration

Purpose:

This layout shows the typical setup for marking left-turn arrows at an intersection.

If the intersection requiring work is not depicted in the diagram, see the layouts in [Section 11: Traffic Control Layouts – Intersections](#).

Standard:

- Road Marking in Progress C-041-xx signs shall be displayed at each end of the work activity area. The distance between the two signs shall not exceed 10 kilometres.
- For short-duration work, a Crew Working Ahead C-004 sign is required.
- For long-duration work, a Construction Ahead C-018-1A sign is required.
- When the speed limit is ≥ 70 km/h, a vehicle with a flashing arrow board (FAB) or a 360-degree flashing light and 4-way flashers shall be stationed within the upstream island.

Guidance:

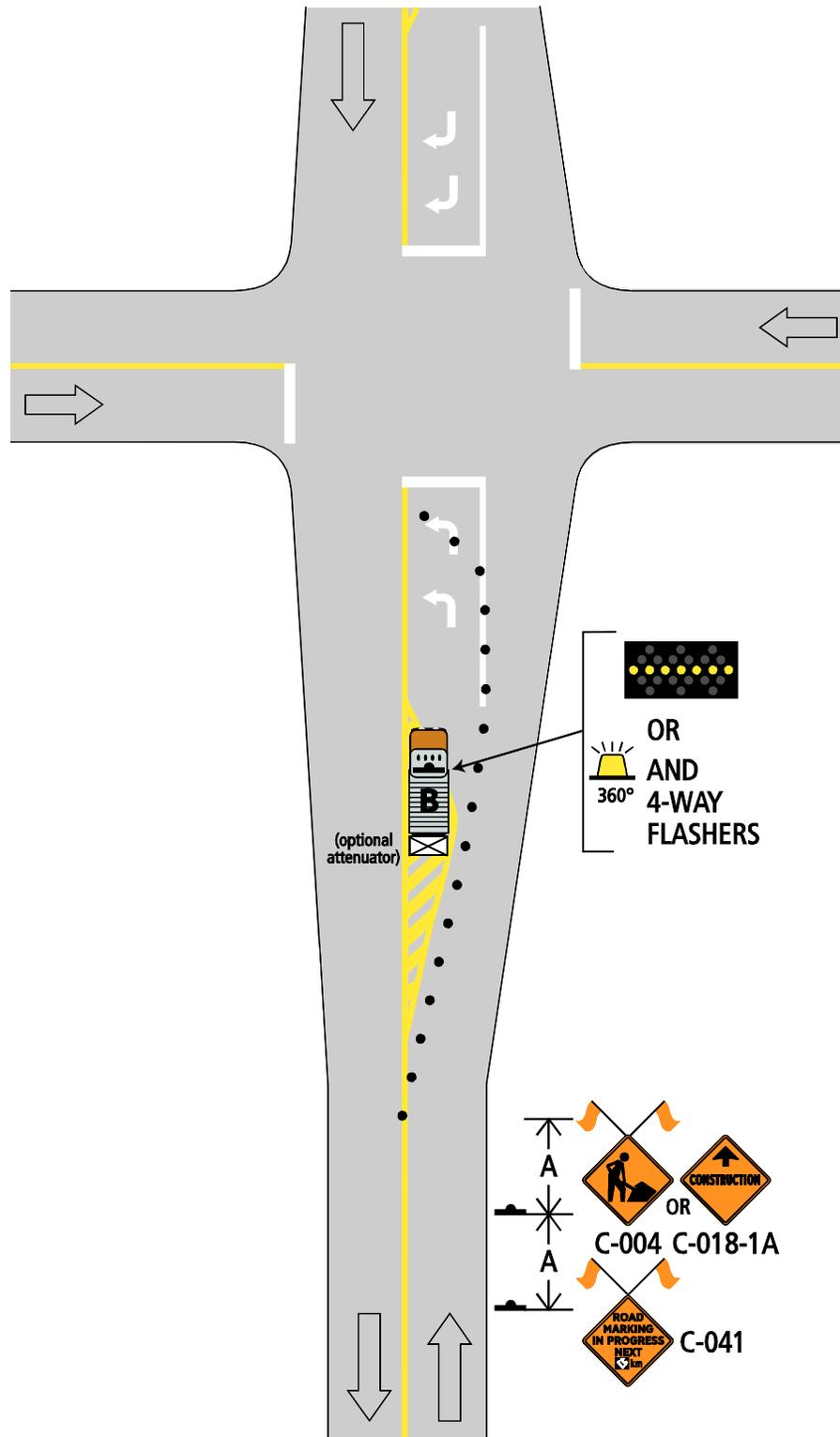
- A work vehicle can be parked on the left-turn loop to activate the left-turn phase of the traffic signal and help to keep vehicles moving in the now-shared through/left-turn lane. If it is parked there for an extended time, the controller may stop activating the left-turn phase so this should be monitored and adjustments made to the setup or traffic control as appropriate.
- If the work allows, keeping a portion of the left-turn slot open near the intersection may provide room for vehicles to make left turns.

Options:

- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	360° flashing light and 4-way flashers.	Barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 14.9: Left-Turn Arrow Marking – Short and Long Duration



14.10 Stop Line and Crosswalk Marking – Left Lanes – Multilane Roadway – Short and Long Duration

Purpose:

This layout shows the typical setup for marking stop lines and crosswalks in left lanes at an intersection.

For multilane intersections, this is usually done in stages, with the inner lane marking done separately from the outer lane marking to minimize disruption to traffic.

If the intersection requiring work is not depicted in the diagram, see the layouts in [Section 11: Traffic Control Layouts – Intersections](#).

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign is required.
- For long-duration work, a Construction Ahead C-018-1A sign is required.
- A Left Lane Closed Ahead C-130-L sign with a C-130-T distance tab is required in advance of a second Left Lane Closed Ahead C-130-L sign.
- Flashing arrow boards (FABs) shall be used inside all lane closure tapers.
- If the speed limit is ≥ 70 km/h, a buffer space shall be used.

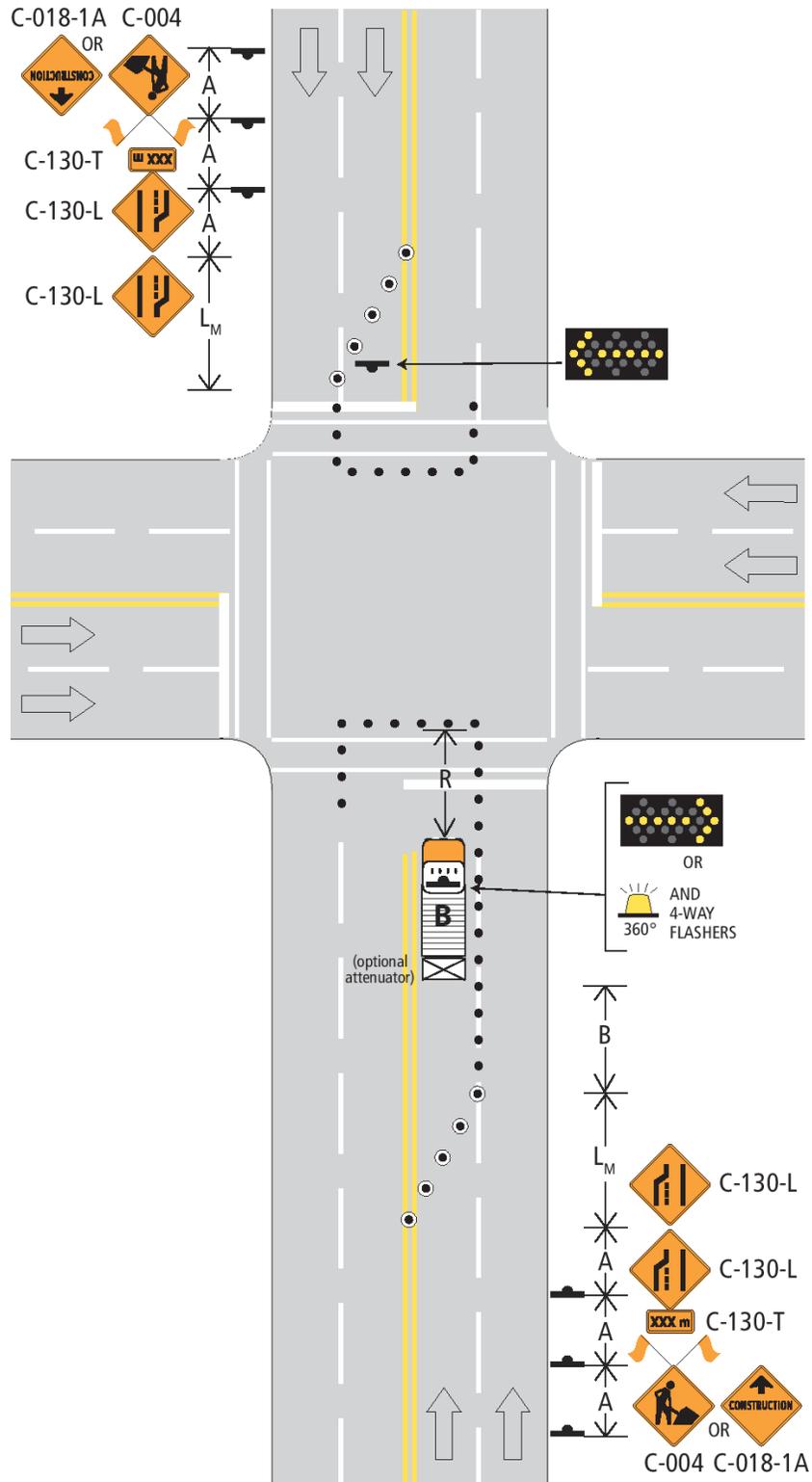
Guidance:

- To maintain traffic flow, it may be necessary to restrict turning movements at the intersection (i.e., prohibit left and/or right turns using Turn Control R-015-L/R signs).
- A buffer vehicle with a 360-degree light and 4-way flashers should be used when workers are on the roadway.
- Depending on the route and traffic volumes, it may be preferable to implement a single lane closure (as opposed to the two closures shown in the diagram).
- When a buffer space is provided, it may be less than the length specified in [Table B – Device Spacing Lengths](#) if space is limited and the adaptation is approved by the Road Authority.

Options:

- A Road Marking in Progress C-041-xx sign may be used in advance of the work.
- For low-volume, low-speed (≤ 60 km/h) roadways:
 - A Lane Closure Arrow C-053 sign may replace the flashing arrow board (FAB).
 - The advance lane drop sign and tab may be removed, and the Crew Working Ahead C-004 sign moved upstream by Table B Distance A.

Figure 14.10: Stop Line and Crosswalk Marking – Left Lanes – Multilane Roadway – Short and Long Duration



14.11 Stop Line and Crosswalk Marking – Right Lanes – Multilane Roadway – Short and Long Duration

Purpose:

This layout shows the typical setup for marking stop lines and crosswalks in right lanes at an intersection.

For multilane intersections, this is usually done in stages, with the inner lane marking done separately from the outer lane marking to minimize disruption to traffic.

If the intersection requiring work is not depicted in the diagram, see the layouts in [Section 11: Traffic Control Layouts – Intersections](#).

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign is required.
- For long-duration work, a Construction Ahead C-018-1A sign is required.
- A Right Lane Closed Ahead C-130-R sign with a C-130-T distance tab is required in advance of a second Right Lane Closed Ahead C-130-R sign.
- Flashing arrow boards (FABs) shall be used inside all lane closure tapers.
- If the speed limit is ≥ 70 km/h, a buffer space is required.

Guidance:

- A buffer vehicle with a 360-degree light and 4-way flashers should be used when workers are on the roadway.
- When a buffer space is provided, it may be less than the length specified in [Table B – Device Spacing](#) if space is limited and the adaptation is approved by the Road Authority.

Options:

- During periods of higher traffic volumes:
 - Left turns may be restricted.
 - The number of intersection legs with active work may be reduced.
- For low-volume, low-speed (≤ 60 km/h) roadways:
 - A Lane Closure Arrow C-053 sign may replace the flashing arrow board (FAB).
 - The advance lane drop sign and tab may be removed, and the Crew Working Ahead C-004 sign moved upstream by Table B Distance A.

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PART B – TRAFFIC CONTROL

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PART B – TRAFFIC CONTROL

Section 15: Traffic Control Layouts – Surveying

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

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15.1 General Information - Surveying

1. Survey crews shall use extra caution because survey work areas often do not have the easily identifiable vehicles and equipment typically present at construction and maintenance work sites.
2. It may be advantageous for survey crew members to become qualified as Traffic Control Persons (see [Section 5: Traffic Control Persons](#)) so that they are authorized to control traffic when required. This will also enable them to supplement personnel who are working solely as TCPs.
3. All signs related to survey activities shall be removed or covered when no survey crew member is working on or adjacent to the roadway.
4. For traffic control layouts applicable to surveying on complex roadways, see:
 - [Section 7: Traffic Control Layouts – Two-Lane, Two-Way Roadways](#)
 - [Section 8: Traffic Control Layouts – Multilane Undivided Roadways](#)
 - [Section 9: Traffic Control Layouts – Multilane Divided Roadways](#)
 - [Section 11: Traffic Control Layouts – Intersections](#)

15.2 Surveying on Shoulder

Purpose:

This layout shows the typical setup for survey work occurring on the shoulder when both the instrument person and the instrument are off the travelled portion of the roadway.

Although the diagram depicts a two-lane, two-way roadway, this setup can also be used for multilane roadways.

Standard:

- A Survey Crew Working Ahead C-003 sign with flags is required in advance of the work area.
- For all speed limits, the work vehicle shall have a 360-degree flashing yellow light and 4-way flashers.

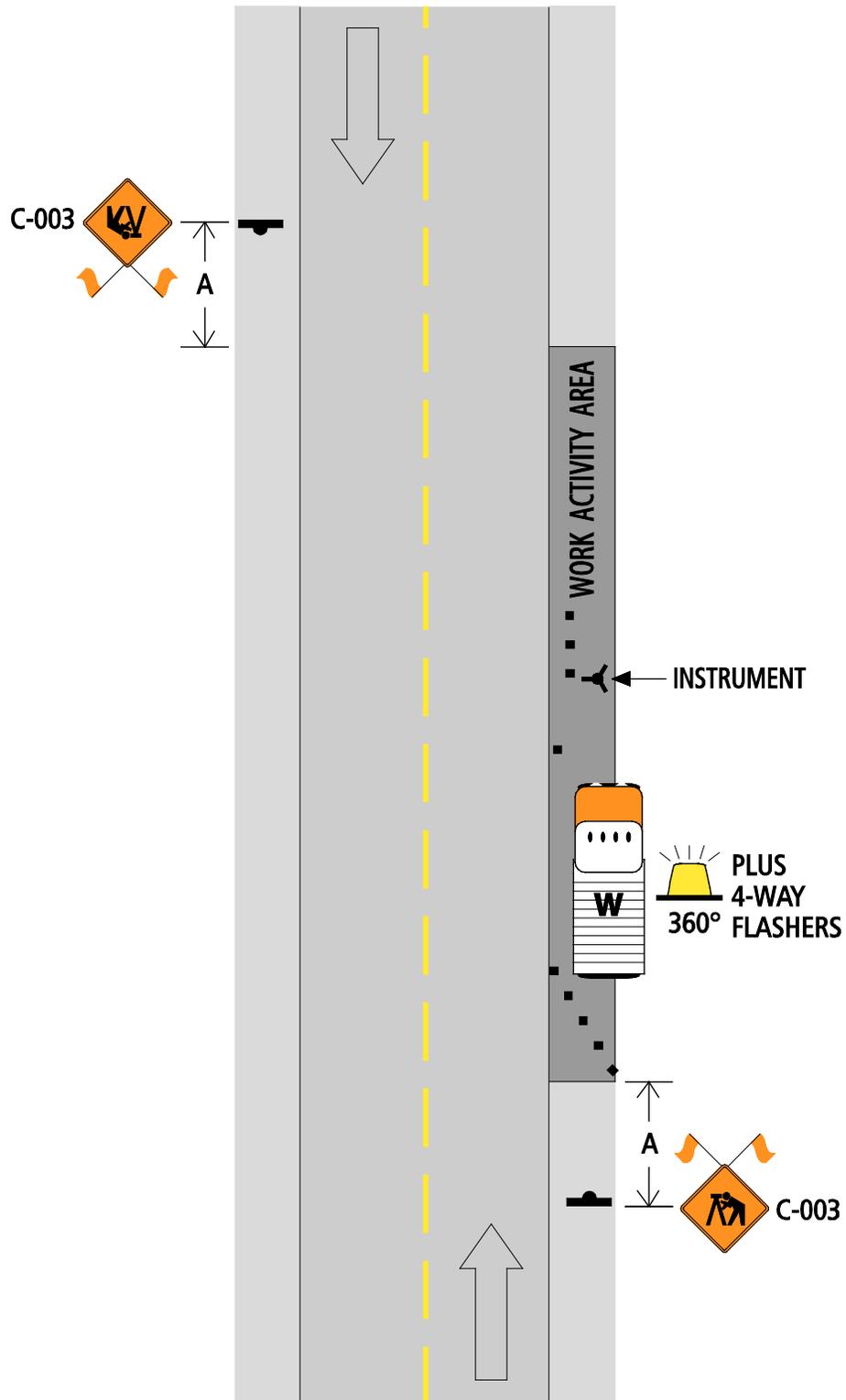
Guidance:

- For high-volume roads and speed limits ≥ 70 km/h, a buffer vehicle with a 360-degree flashing yellow light and 4-way flashers should also be used.
- If the roadway is a multilane divided roadway, the Survey Crew Working Ahead C-003 sign in the opposing direction should be omitted.

Options:

- A flashing arrow board (FAB) in caution mode may be used instead of the work vehicle with a 360-degree flashing yellow light and 4-way flashers.
- Where cyclists are regularly observed using the shoulder, a Share the Road W-132-1 sign may be used with an appropriate cycling hazard tab (see [Section 18: Traffic Control Layouts – Bicycle Lanes](#) for additional information).

Figure 15.2: Surveying on Shoulder



15.3 Surveying on Centreline

Purpose:

This layout shows the typical setup for surveying on centreline.

If passing traffic is a concern, other traffic control methods and layouts shall be used.

Standard:

- A Road Survey Ahead C-018-4 sign shall be used in advance of the general survey area. The distance between opposing C-018-4 signs shall not exceed 2 kilometres. The signs should be moved as the work progresses so that the work vehicles remain within the distance indicated on the signs.
- A Survey Crew Working Ahead C-003 sign with flags shall be used in advance of the work area.
- A shadow vehicle shall be used to provide advance warning to approaching vehicles.
- All vehicles shall be equipped with a 360-degree flashing light and 4-way flashers.
- If sufficient shoulder width (≥ 3.5 metres) is available for traffic to pass the survey crew on the right, a Pass this Side C-042-R sign shall be installed on the rear of the shadow vehicle. Otherwise, a Yield to Oncoming Traffic R-056-1 sign shall be used.

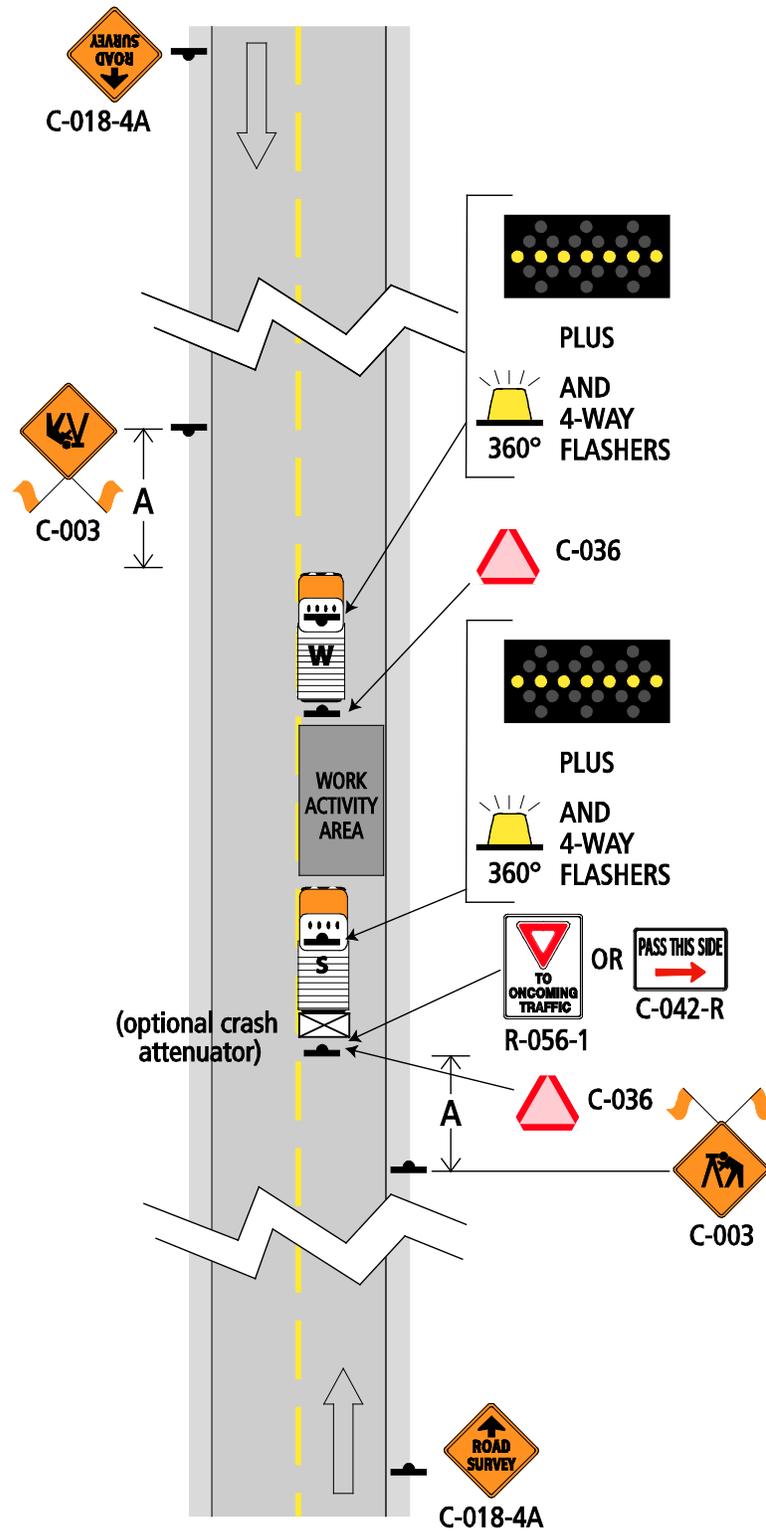
Guidance:

- A Survey Crew Working – Maximum Speed C-002-1 sign and a Thank You Resume Speed C-086-1 sign should be used only where conditions warrant (see [Section 2.4: Management of Speed](#) and [Section 5: Traffic Control Persons](#) for speed zone information). The distance between the opposing C-002-1 signs should not exceed 2 kilometres.

Options:

- The nature of the work activity area will vary, depending on the length and type of survey being completed. For example, a centreline survey may be completed using a rolling setup, in which case a more appropriate traffic control layout from the Manual should be applied.
- A spotter may be required to assist the instrument person by watching traffic.

Figure 15.3: Surveying on Centreline



15.4 Surveying in Intersections

Purpose:

This layout shows the typical setup for survey work occurring in an unsignalized intersection.

For more complex intersection layouts, see [Section 11: Traffic Control Layouts – Intersections](#).

Standard:

- Survey Crew Working Ahead C-003 signs with flags shall be used in advance of the work area.
- A Survey Crew Working – Maximum Speed C-002-1 sign and a Thank You Resume Speed C-086-1 sign should be used only where conditions warrant (see [Section 2.4: Management of Speed](#) and [Section 5: Traffic Control Persons](#) for speed zone information).

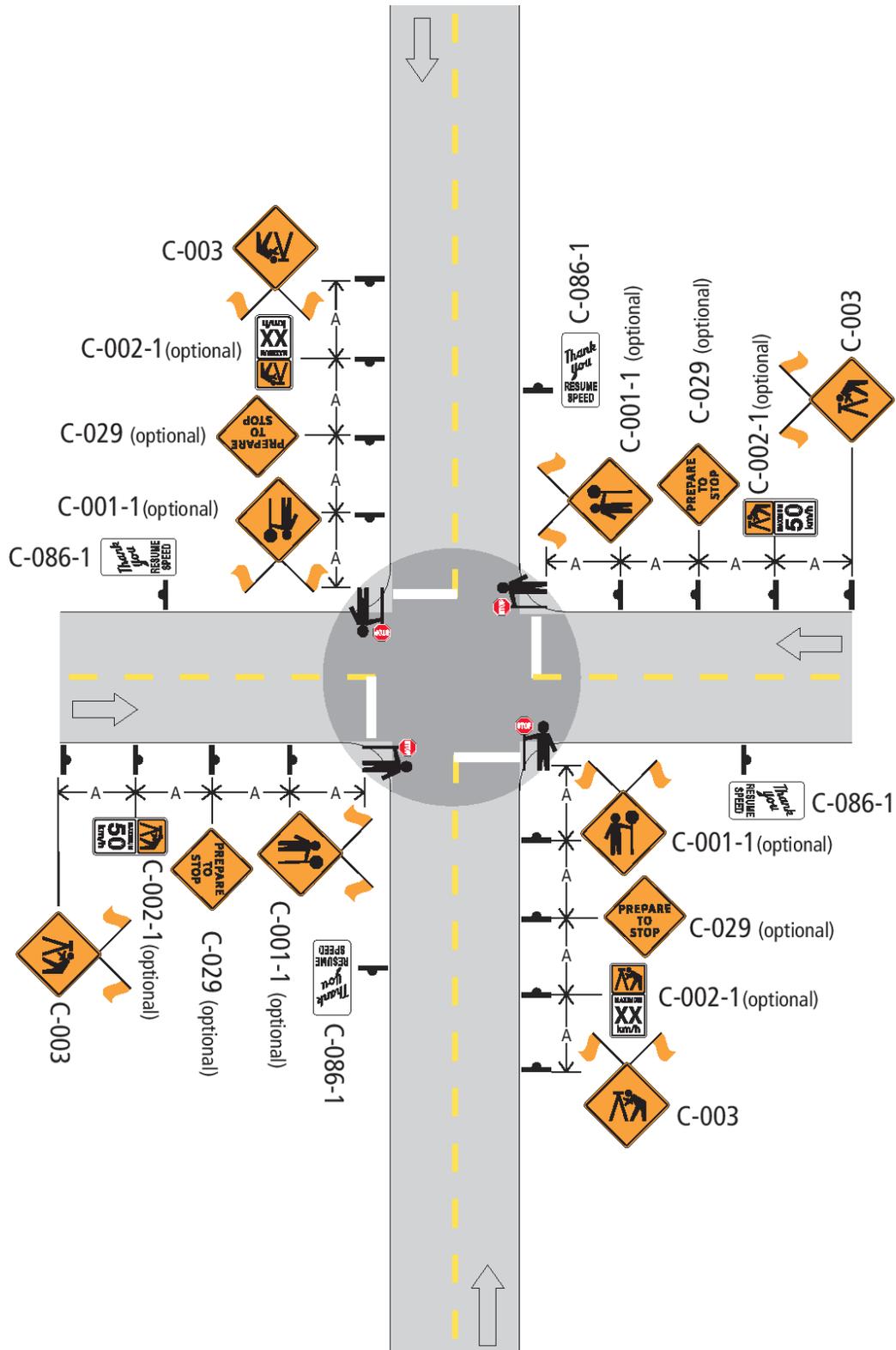
Guidance:

- If the Survey Crew Working – Maximum Speed C-002-1 sign is not required, the Survey Crew Working Ahead C-003 sign can be moved downstream by Table B Distance A.
- If no Temporary Speed Zone is used, the Work Zone Ends C-088 sign can be used instead of the Thank You Resume Speed C-086-1 sign.

Options:

- Traffic Control Persons are optional for this setup. If they are used, the Traffic Control Person Ahead C-001-1 sign and Prepare to Stop C-029 sign are required and the Flagger Ahead C-001-2 sign may be used for additional advance warning.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.

Figure 15.4: Surveying in Intersections



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PART B – TRAFFIC CONTROL

Section 16: Traffic Control Layouts – Avalanche Control

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PART B– TRAFFIC CONTROL

Section 16: Traffic Control Layouts – Avalanche Control

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

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16.1 General Information

Where snow avalanche conditions warrant, a highway may be closed at:

- locations with gates
- designated locations without gates
- other locations approved by the Ministry Avalanche Technician

Closure locations should be on a relatively level grade, be free of avalanche hazard, and have a turnaround capacity for large vehicles.

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- For night operations, Type A yellow flashing lights are required on Avalanche Control C-057 signs, Prepare to Stop C-029 signs, and Traffic Control Person Ahead C-001-1 signs (when TCPs are used).
- Gate bases should be marked with Hazard W-154-L/R markers.

Guidance:

- When signs are not required—including those on gates—they should be removed, folded, or covered, and flags and flashing lights should be removed except for the flashing red lights installed on avalanche gates.
- On multilane divided roadways, and where space allows, the specified signing should be repeated in the median straight across from the shoulder signage.
- In addition, signage may be erected on the left shoulder where space allows, provided that it does not block sight lines or conflict with other signage.
- This work typically takes place during daylight hours. If the work will continue into the night, any TCP stations should be illuminated by overhead lighting.

Options:

- Additional advance signing—such as Avalanche Control C-057 signs or dynamic message signs (DMS)—may be used on curvilinear approaches or where it is anticipated that vehicle queues may extend past the standard signage layouts.

16.2 Road Closure for Avalanche Control – Gates without TCPs

Purpose:

This layout shows the typical setup where the highway must be closed for avalanche control, and the existing gates are used, without Traffic Control Persons.

Standard:

- A Stop R-001 sign and a Road Closed R-012 sign shall be clearly displayed on the gate as shown in the diagram.
- Type B red flashing lights shall be erected on the gate.
- The Avalanche Control C-057 sign and the Prepare to Stop C-029 sign shall have flags during the daytime.
- A Stop Ahead C-111 sign shall be positioned in advance of the closed gates.

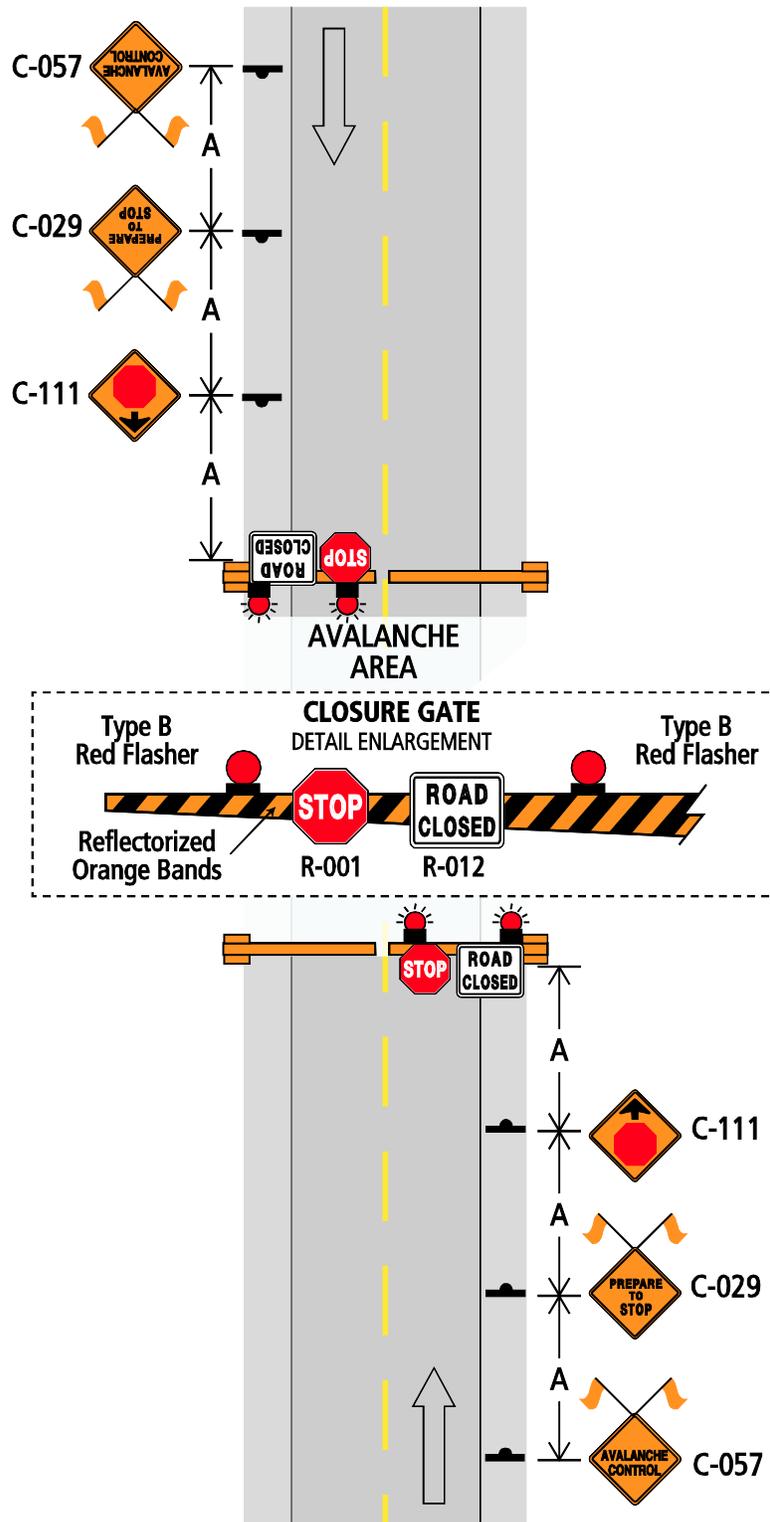
Guidance:

- If TCPs are not used, the avalanche barrier gates should be locked as authorized by the Ministry Avalanche Technician.
- Overhead permanent dynamic message signs (DMS) should be used whenever possible to inform travellers of the road closures.
- Additional portable dynamic message signs (DMS) may be used closer to the closure area to advise of closure periods, wait times, instructions for motorists in the waiting queue, and other details. See [Section 4.3.3: DMS Fundamentals](#) for sample messages and abbreviations.

Options:

- None at this time.

Figure 16.2: Road Closure for Avalanche Control – Gates without TCPs



16.3 Road Closure for Avalanche Control – Gates with TCPs

Purpose:

This layout shows the typical setup where the highway must be closed for avalanche control, and existing gates and Traffic Control Persons are both present.

In addition to directing traffic, TCPs may be useful for providing information to motorists about the closure, monitoring queue lengths, and adjusting signage as necessary.

Standard:

- A Stop R-001 sign and a Road Closed R-012 sign shall be clearly displayed on the gate as shown in the diagram.
- Type B red flashing lights shall be erected on the gate.
- The Avalanche Control C-057 sign, Prepare to Stop C-029 sign, and Traffic Control Person Ahead C-001-1 sign shall be positioned in advance of the TCP, and shall have flags during the daytime.

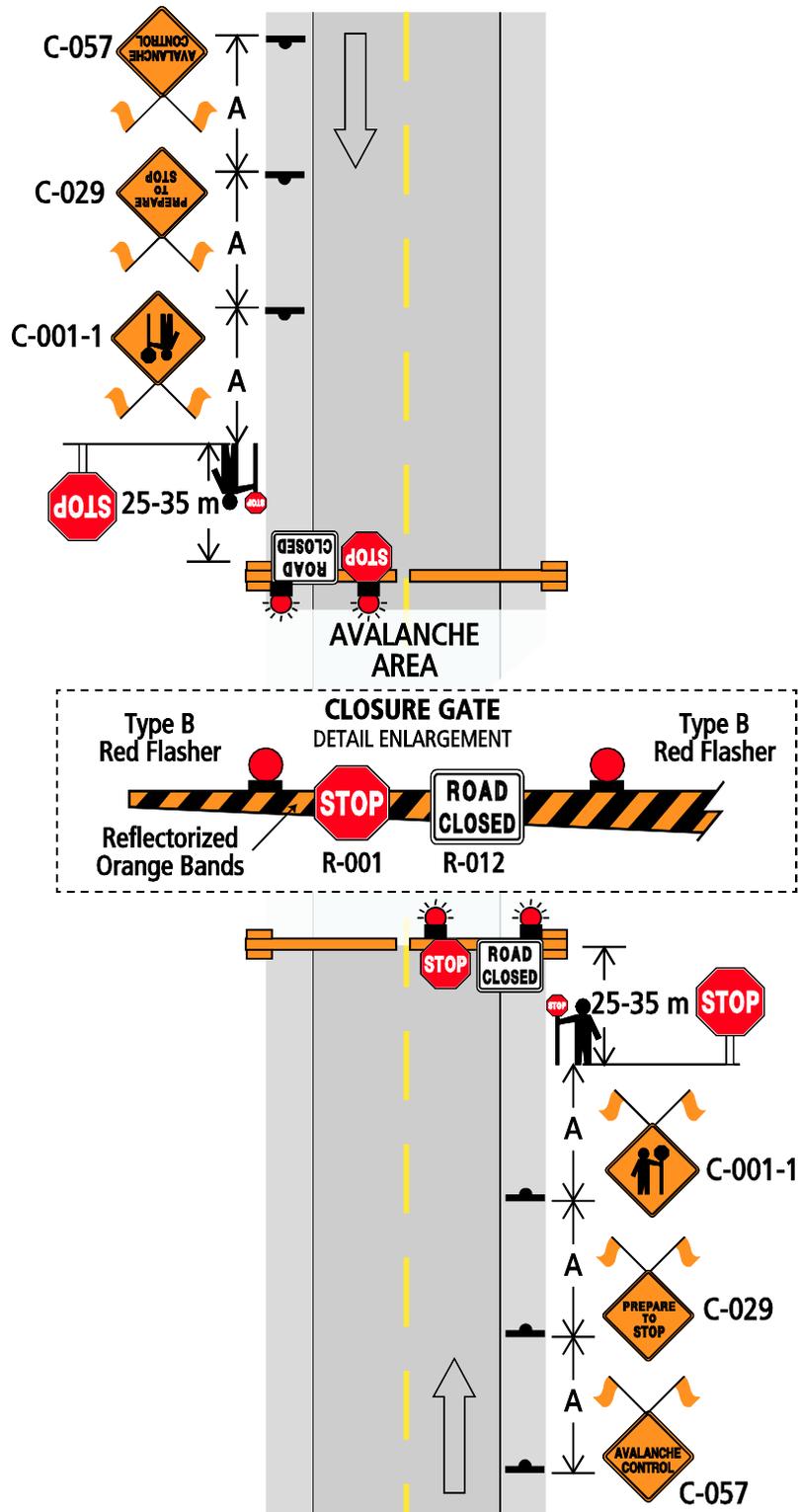
Guidance:

- Overhead permanent dynamic message signs (DMS) should be used whenever possible to inform travellers of the road closures.
- Additional portable dynamic message signs (DMS) may be used closer to the closure area to advise of closure periods, wait times, instructions for motorists in the waiting queue, and other details. See [Section 4.3.3: DMS Fundamentals](#) for sample messages and abbreviations.
- TCPs should monitor queue lengths, and adjust or add more advance warning signage as required.

Options:

- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.

Figure 16.3: Road Closure for Avalanche Control – Gates with TCPs



16.4 Road Closure for Avalanche Control – Barricades and TCPs

Purpose:

This layout shows the typical setup where the highway must be closed for avalanche control in a location where no gates are present.

When avalanches occur in non-gated areas, Ministry Avalanche Technicians determine the closure and traffic control requirements for using barricades and Traffic Control Persons.

In addition to directing traffic, TCPs may be useful for providing information to motorists about the closure, monitoring queue lengths, and adjusting signage as necessary.

Standard:

- A Stop R-001 sign and a Road Closed R-012 sign shall be clearly displayed on the barricade as shown in the diagram.
- Type B red flashing lights shall be erected on the barricade.
- The Avalanche Control C-057 sign, Prepare to Stop C-029 sign, and Traffic Control Person Ahead C-001-1 sign shall be positioned in advance of the TCP, and shall have flags during the daytime.

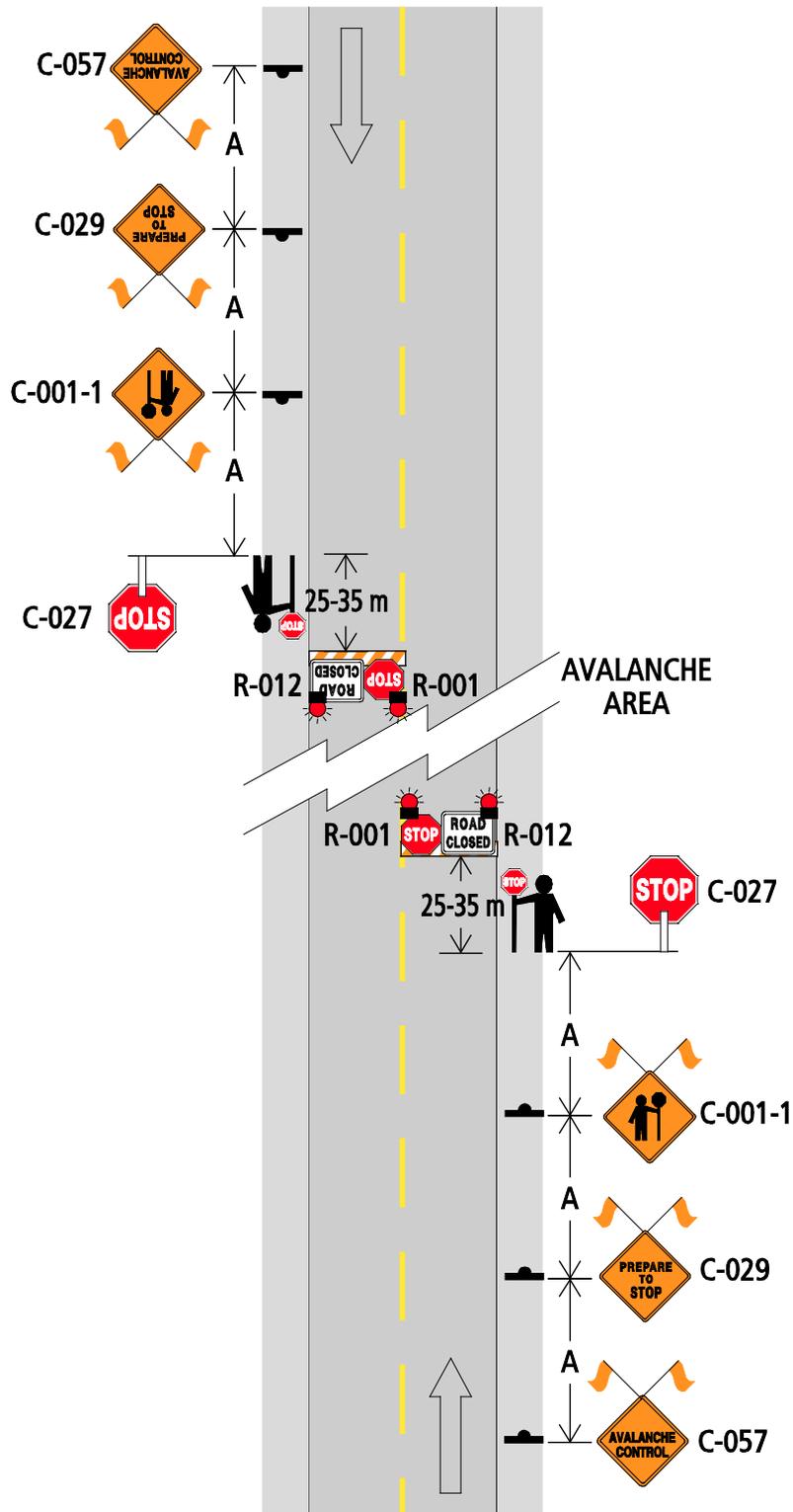
Guidance:

- Overhead permanent dynamic message signs (DMS) should be used whenever possible to inform travellers of the road closures.
- Additional portable dynamic message signs (DMS) may be used closer to the closure area to advise of closure periods, wait times, instructions for motorists in the waiting queue, and other details. See [Section 4.3.3: DMS Fundamentals](#) for sample messages and abbreviations.
- TCPs should monitor queue lengths, and adjust or add more advance warning signage as required.

Options:

- The Flagger Ahead C-001-2 sign or Prepare to Stop C-029 sign may be used for additional advance warning where TCPs are stopping traffic.
- When TCPs are directing traffic, the construction speed limit shall be ≤ 70 km/h.

Figure 16.4: Road Closure for Avalanche Control – Barricades and TCPs



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PART B – TRAFFIC CONTROL

Section 17: Traffic Control Layouts – Utility Work

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PART B – TRAFFIC CONTROL

Section 17: Traffic Control Layouts – Utility Work

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

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17.1 General Information - Utility Work

1. The traffic control required for utility work on roadways is typically no different from that required for road construction or maintenance on roadways.
2. The layouts in Section 17 are designed for utility work in a low-speed, low-volume setting.
3. When these layouts are not sufficient for the identified work—that is, if the work is being done in a higher speed or higher volume environment, or if it is related to overhead power, phone, or fibre optic lines—the other Traffic Control Layouts in the Manual (i.e., those in Sections 7 to 18) shall be considered, and the appropriate ones applied.

17.2 Utility Work on Centreline – Urban Area – Short and Long Duration

Purpose:

Various utilities may be situated within the roadway, including manholes and catch basins.

This layout is intended for utility works that can take place in a single shift on low-speed urban roadways.

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign is required.
- For long-duration work, a Construction Ahead C-018-1A sign is required.
- Where the posted speed limit is ≥ 70 km/h, a flashing arrow board (FAB) is required.
- For two-lane, two-way roadways, at least 3 metres of roadway shall remain available on each side of the work area for vehicles to pass on either side. If this cannot be achieved on each side, single lane alternating traffic is required.
- For multilane roadways, lane closures are required.
- Night work may be required because of the site conditions, in which case traffic control signage and devices shall be increased to include:
 - tubular markers instead of cones
 - flashing yellow lights on signs instead of flags

Guidance:

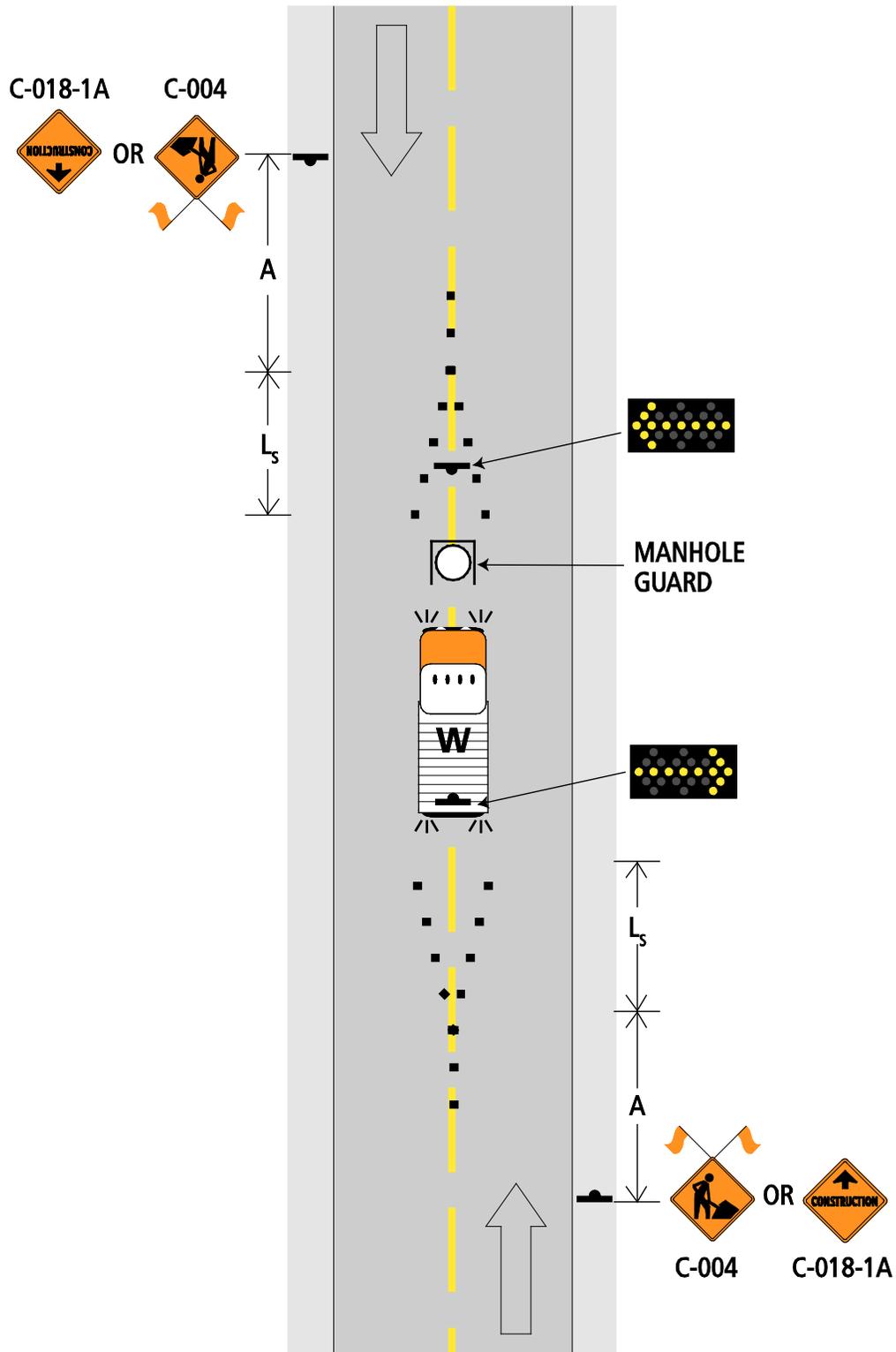
- A Crew Working – Maximum Speed C-002-2 sign and a Thank You Resume Speed C-086-1 sign should be used only where conditions warrant.

Options:

- The flashing arrow board (FAB) may be replaced as shown below.

Speed Limit	Workers or Work Vehicles Present	No Workers or Vehicles Present
≤ 60 km/h	Lane Closure Arrow C-053 sign plus 360° flashing light and 4-way flashers.	Lane Closure Arrow C-053 sign plus barricade and Type A yellow warning light.
≥ 70 km/h	No substitution.	

Figure 17.2: Utility Work on Centreline – Urban Area – Short and Long Duration



17.3 Traffic Signal Relamping/Cleaning – Short Duration

Purpose:

Electrical utilities within a signalized intersection periodically require the installation of a new signal head or lamps, or cleaning.

This layout is for short-duration work on low-speed, low-volume roadways.

For work on high-volume roadways, which require more complex layouts, and for night work (long-duration work), see [Section 11: Traffic Control Layouts – Intersections](#).

Standard:

- A work vehicle equipped with 4-way flashers shall be stopped under a signal head where lamps are to be replaced or cleaned. It requires a flashing arrow board (FAB) that directs traffic into the right or left lane.
- A Crew Working Ahead C-004 sign shall be used on all approaches to the intersection.
- If Traffic Control Persons are used, they shall never provide direction that conflicts with that provided by a traffic signal. Traffic shall be directed by a police officer or the signal shall be turned off or covered.

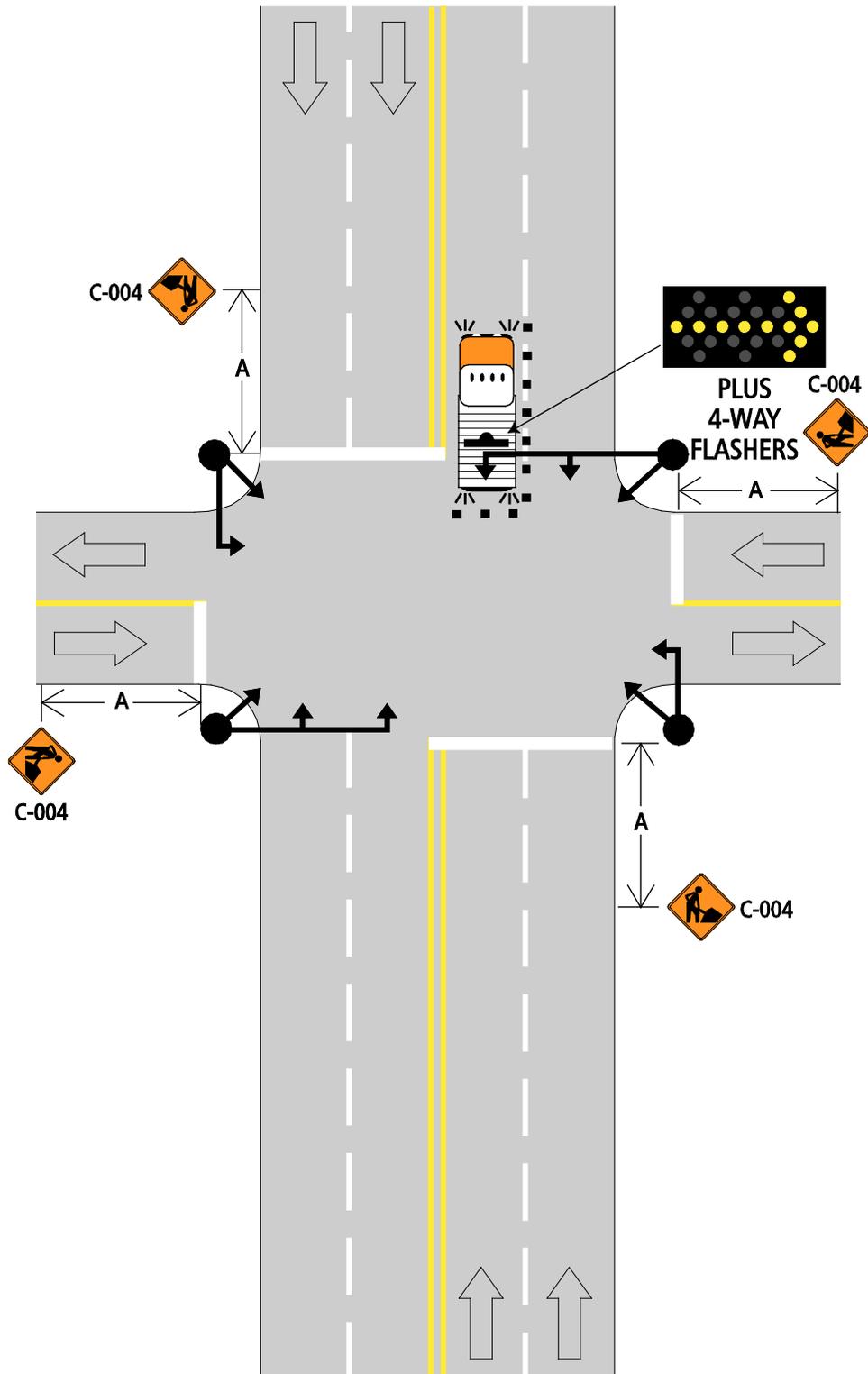
Guidance:

- None at this time.

Options:

- None at this time.

Figure 17.3: Traffic Signal Relamping/Cleaning – Short Duration



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PART B – TRAFFIC CONTROL

Section 18: Traffic Control Layouts – Bicycle Lanes

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PART B – TRAFFIC CONTROL

Section 18: Traffic Control Layouts – Bicycle Lanes

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

18.1 General Information on Accommodating Cyclists

Under the Motor Vehicle Act, cyclists have the same rights and duties as operators of motor vehicles. Therefore, the signage and traffic control measures used for drivers also applies to cyclists.

The potential for cyclists to respond differently than drivers under certain conditions should be anticipated and considered. For example, road surface conditions can impact cyclists more so than motor vehicles.

The following factors shall be considered when establishing or inspecting a work zone that may be traversed by cyclists:

- Cyclists are vulnerable road users who have little protection from falls and collisions.
- Cyclists ride on two narrow tires.
- The loss of traction or deflection of the front bicycle wheel can cause a fall.
- Loose gravel, uneven surfaces, milled pavement, and tack coats can create problems for cyclists.
- In the dark, the limitations of bicycle lights make temporary road works difficult for cyclists to see.
- Road works on urban roadways may affect a large variety of cyclists with varying abilities, ranging from children to commuters.

Specific ways to accommodate cyclists during road works are addressed below.

18.1.1 Roadway Surface Conditions

Since cyclists operate on two narrow tires, the quality of the road surface is more important than it is for cars and trucks.

Wherever possible, a smooth, hard surface (such as asphalt) should be maintained for cyclists. Compacted gravel may be acceptable for temporary conditions.

Loose or uneven surfaces should be avoided, and signs indicating bumps or changes in the roadway surface should be used to notify cyclists.

18.1.2 Roads with Bike Lanes or Paved Shoulders

Where cyclists approach the work zone in a bike lane or on a paved shoulder, it is preferable to maintain those facilities within the work zone.

At temporary facilities, a minimum 1-metre width may be used as the space for riding cyclists, with a 0.3-metre clearance from vertical obstacles like cones or barriers.

If there is insufficient space for bicycles and motor vehicles to operate side-by-side, a temporary shared lane may be created. Cyclists and motorists can share a lane over a short distance in low-speed environments (≤ 60 km/h).

Notification should be provided that the roadway is a shared roadway and that the lane is too narrow for side-by-side operation. Cyclists and motorists should operate single file (e.g. Cyclist Right-of-Way Take the Lane C-184 sign).



C-184
Cyclist Right-of-Way
Take the Lane

18.1.3 Roads with Shared Lanes

A shared lane should be used where the width required for a separate bike lane or paved shoulder cannot be maintained.

In low-speed environments (≤ 60 km/h), a shared lane width less than 4.3 metres may be used. Where lane widths are less than 4.0 metres, a shared lane may not be feasible because drivers may have to enter the oncoming lane in order to pass cyclists.

Where the shared lane width is less than 4.0 metres, consider prohibiting motor vehicles from passing cyclists (i.e., single file vehicle/bicycle operation) or detouring cyclists.

Where speeds exceed 60 km/h, a shared lane width of 4.3 metres should be maintained. If this is not possible, it may be necessary to detour cyclists.

18.1.4 Cyclist Detours

Accommodating cyclists within the work zone is preferable to detouring them. Bicycles require less space than cars and can often be accommodated even when vehicles must be detoured. Cyclists can share a lane over a short distance in low-speed environments (≤ 60 km/h).

Requiring cyclists to dismount should be avoided but may be preferable to a lengthy detour. The “cyclists dismount and walk” measure should be considered only if the reason for dismounting is immediately apparent to cyclists. Otherwise, many cyclists may ignore this instruction. Generally, cyclists should not be expected to dismount and walk for more than 50 metres.

Detours should be established where sufficient width or roadway surface for cyclists cannot be maintained through the work zone.

Cyclist detour signs (B-C-004 series) should be used to mark cyclist-specific detour routes and guide cyclists along the route.

Detours in which cyclists have to make left turns or cross arterial roadways without a signal or push-button crosswalks are discouraged.



B-C-004-1A
Bicycle Detour Ahead

Detours are usually not a realistic option for cyclists on rural highways because there may be few alternatives, and detours using alternative routes may cover substantial distance.

18.1.5 Signs and Other Provisions for Cyclists

Signs and other provisions to accommodate cyclists will vary with the nature of the road work, but may include:

- use of dynamic message signs (DMS) or customized signs to forewarn cyclists of construction activity
- use of a Bicycles/Pedestrians Slow B-C-020 series sign within the advance signing array to advise drivers and cyclists to slow down
- use of a Share the Road W-132-1 series sign to advise drivers that cyclists will be using the travelled roadway
- use of appropriate pavement surface condition signs (e.g., Grooved Pavement C-011 sign)
- regular sweeping of the shoulder near the active work site to reduce debris from construction activity
- providing cyclists with a ride through the work site when pilot vehicles are present
- consultation with local cycling organizations
- detouring cyclists (may not be feasible in rural areas)

The traffic control layouts are considered the minimum standard. The associated text description of each figure highlights the key standards as well as guidance and options that can be considered by the user. The following information is typical on most layouts in this section:

Standard:

- For short-duration work, a Crew Working Ahead C-004 sign is required.
- For long-duration work, a Construction Ahead C-018-1A sign is required.
- A Bike Lane Closed B-C-002 sign is required in advance of the bicycle lane closure.

Guidance:

- None at this time.

Options:

- A dynamic message sign (DMS) may be used for additional messaging if space allows.
- In low speed (≤ 60 km/h) urban areas (within municipal boundaries), customization of traffic control layouts, including closer device spacing and shorter taper lengths, may be necessary to maintain access and mobility. In these cases, document why adjustments are being made.

18.2 Bicycle Lane Shift

Purpose:

This layout shows the typical setup of a bicycle lane shift where the road width allows bicycle traffic to be maintained through the work area by shifting all vehicle and bicycle traffic and still maintaining a separated lane for bicycles.

This layout does not apply for shoulder closures.

Standard:

- A Lane Shift C-117-L/R sign shall be used in advance of the shifting lanes.
- A Lane Closure Arrow C-053 sign shall be used where the bicycle and vehicle traffic is being shifted.

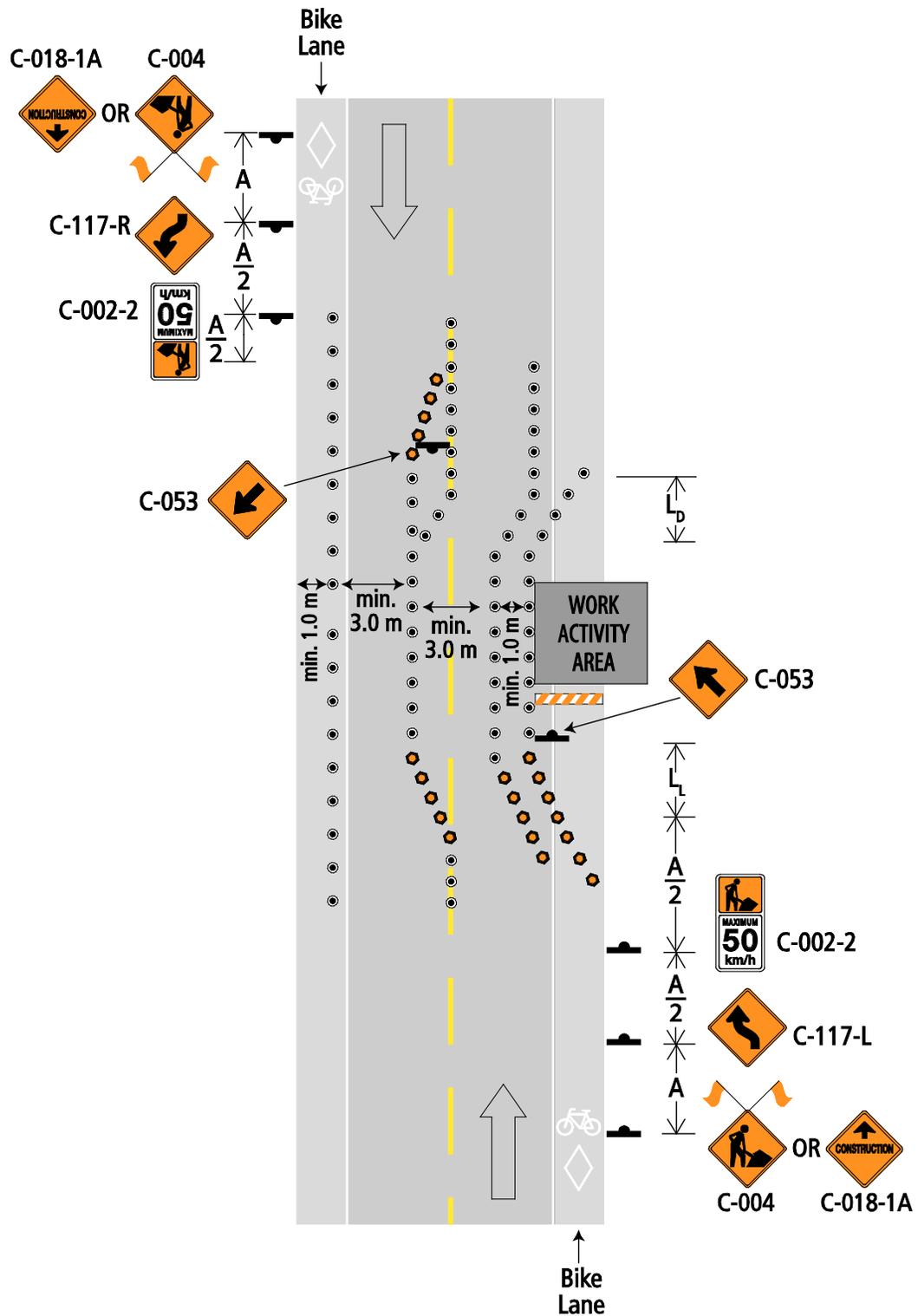
Guidance:

- If standard lane widths cannot be maintained:
 - The vehicle lane may be reduced to a minimum width of 3.0 metres.
 - The bicycle lane may be reduced to a minimum width of 1.0 metre.
- Where there are obstructions adjacent to the open lane, such as barriers, an additional 0.3 metres of bicycle lane width should be provided.
- The bicycle lane should be delineated from the vehicle lane with channelizing devices.
- Where lane widths are reduced, a Construction Speed Zone of 50 km/h or less should be implemented for the section of roadway where lanes are shifted.

Options:

- If the speed limit is ≤ 60 km/h:
 - Tubular markers may be used for leading tapers instead of drums.
 - Cones may be used for protecting the work area.
- For short-duration work when bicycle volumes are low, the bicycle lane may be closed with the following changes to the layout:
 - delineation along the bicycle lane may be removed.
 - a Share the Road W-132-1 sign should be installed upstream of the lane shift.
 - a Bike Lane Closed B-C-002 sign should be installed upstream of the lane shift.

Figure 18.2: Bicycle Lane Shift



18.3 Bicycle Lane Closed – Take the Lane (≤ 50 km/h)

Purpose:

This layout shows the typical setup of a bicycle lane closure in a low-speed urban environment where the regular posted speed is ≤ 50 km/h and a bicycle lane cannot be maintained through the work area because of lane widths or other constraints.

This layout should be used only in areas where the vehicle lane is less than 4.0 metres wide, and there is insufficient lane width for side-by-side bicycle and motor vehicle operation.

It is preferable to allow cyclists to continue cycling when work occurs on a bicycle route, so cyclists are instructed to ride in the centre of the vehicle lane (take the lane) in this layout.

This layout does not apply for shoulder closures.

Standard:

- A Cyclist Right-of-Way “Take the Lane” C-184 sign shall be placed in advance of the taper.
- The speed limit shall be ≤ 50 km/h through the section of roadway where cyclists are taking the lane.

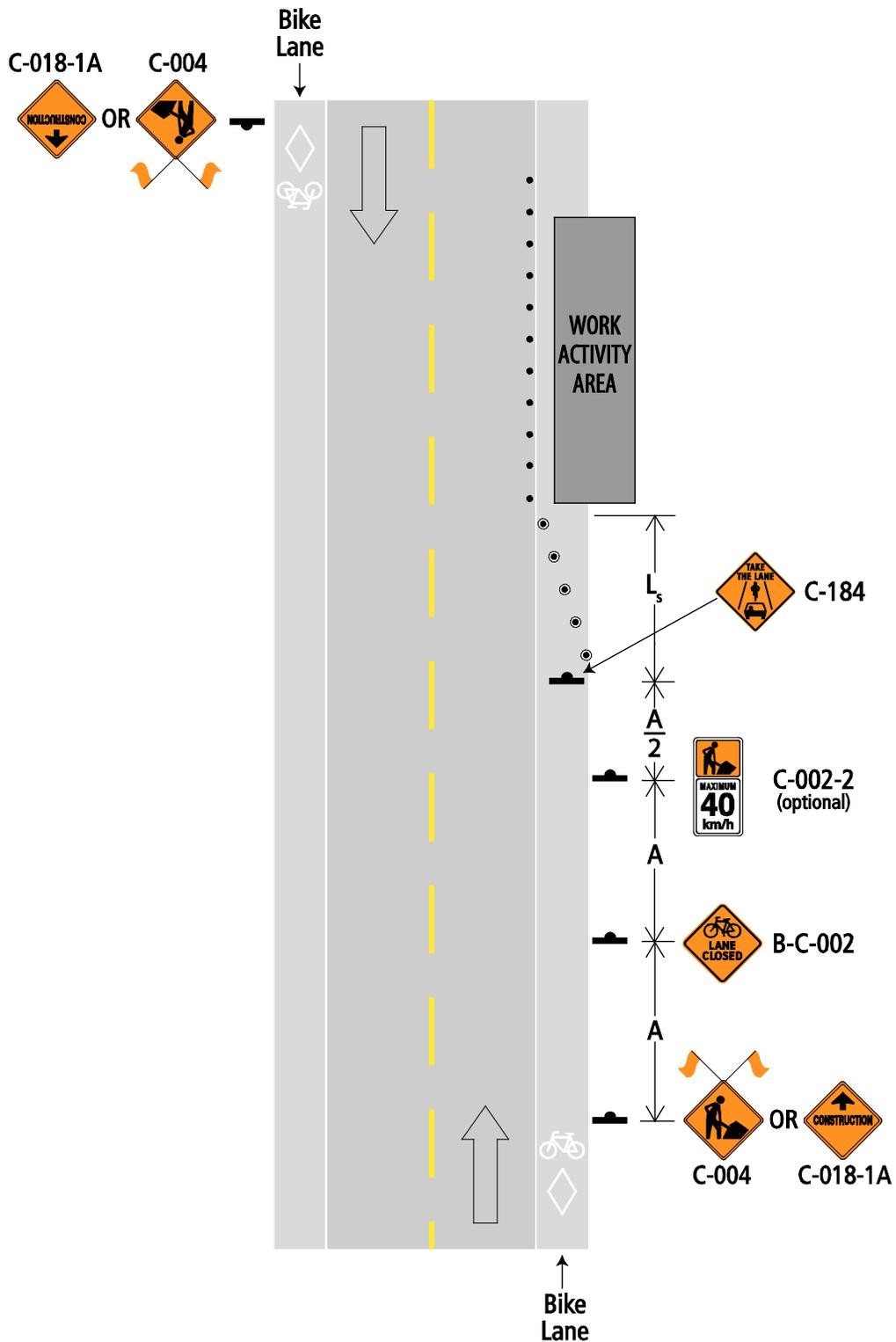
Guidance:

- A reduced Construction Speed Zone should be considered where cyclists are advised to take a vehicle lane.

Options:

- Additional steps may be taken to slow vehicle traffic, such as using a Reduce Speed C-032 sign. See also [Section 2.4: Management of Speed](#).
- For closures longer than 150 metres, alternative strategies include:
 - a bicycle lane shift - see [Section 18.2: Bicycle Lane Shift](#)
 - a bicycle detour - see [Section 18.5: Bicycle Lane Closed – Bicycle Detour](#)

Figure 18.3: Bicycle Lane Closed – Take the Lane (≤ 50 km/h)



18.4 Bicycle Lane Closed – Share the Road

Purpose:

This layout shows the typical setup for a bicycle lane closure where lane widths allow bicycle traffic to be maintained through the work area by shifting all traffic.

This layout should be used only in areas where lane widths of 4.0 metres or more can be maintained and there is sufficient lane width to have side-by-side bicycle and motor vehicle operation.

This layout does not apply for shoulder closures.

Standard:

- A Road Diversion C-052-L/R sign shall be used to identify the road pattern change.
- A Share the Road W-132-1 sign shall be positioned in advance of the taper.
- A Lane Closure Arrow C-053 sign shall be used where the bicycle and vehicle traffic is being shifted.
- A minimum overall lane width of 4.0 metres shall be maintained.

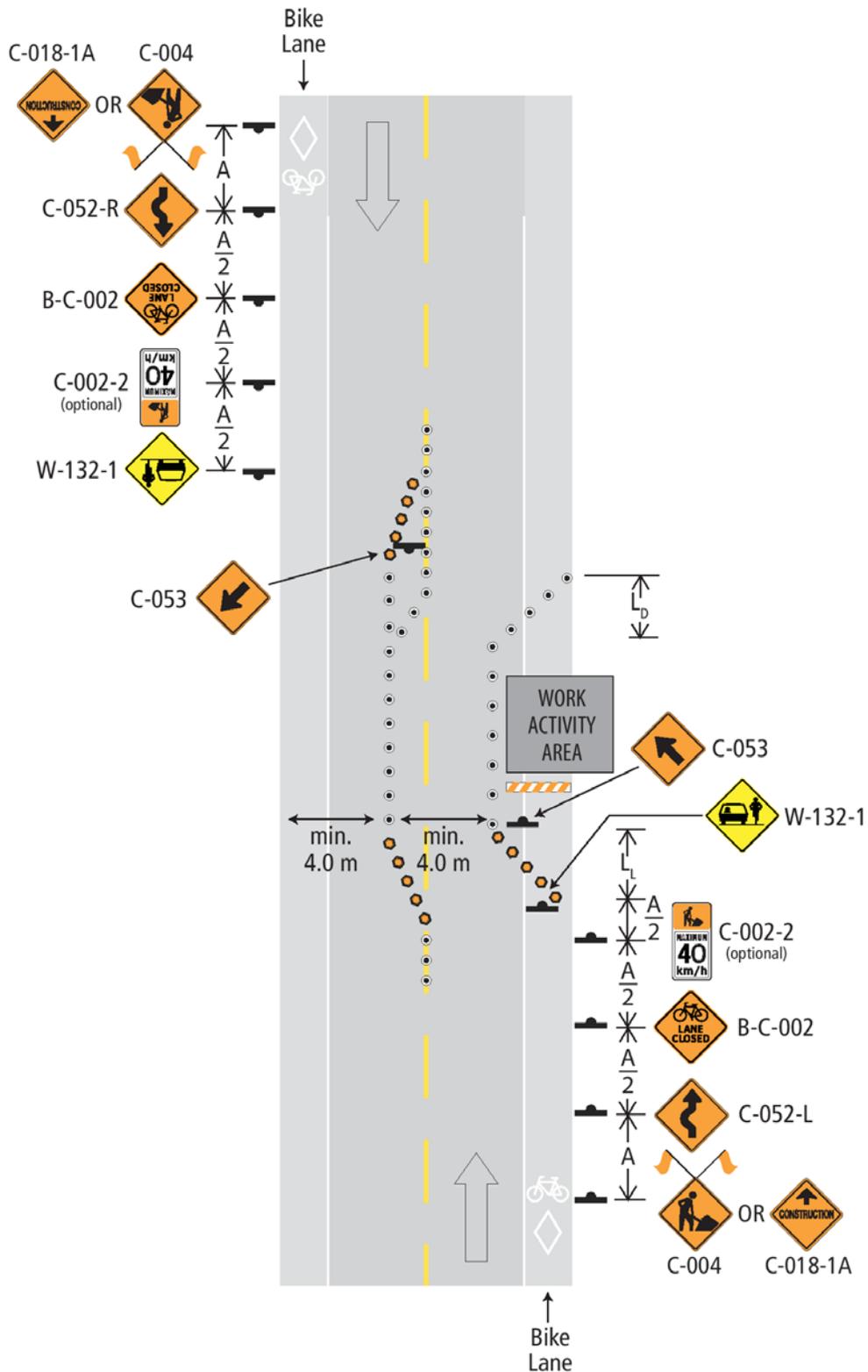
Guidance:

- Where there are vertical obstructions (e.g., barriers) or drop-offs adjacent to the open lane, an additional 0.3 metres of shy distance should be provided.
- A Construction Speed Zone of 50 km/h or less should be implemented for the section of roadway where bicycles and vehicles are sharing the lane.

Options:

- If there is sufficient lane width, the bicycle space may be delineated from the traffic space with channelizing devices or temporary pavement markings.
- If the speed limit is ≤ 60 km/h:
 - Tubular markers may be used for leading tapers instead of drums.
 - Cones may be used instead of tubular markers.
- A Lane Shift C-117-L/R sign may be used instead of a Road Diversion C-052-L/R sign in the opposite direction.

Figure 18.4: Bicycle Lane Closed – Share the Road



18.5 Bicycle Lane Closed – Bicycle Detour

Purpose:

This layout shows a bicycle lane closure where a bicycle detour is required.

A bicycle detour may be necessary where it is not possible to maintain sufficient roadway surface or width for cyclists through the work zone.

In this layout, cyclists are instructed to detour to a different route in advance of the construction area. Where possible, the detour should begin at a location where the construction is within sight so that cyclists can see the reason for the detour.

Standard:

- A series of Bicycle Detour B-C-004 signs with appropriate directions shall be used along the detour.

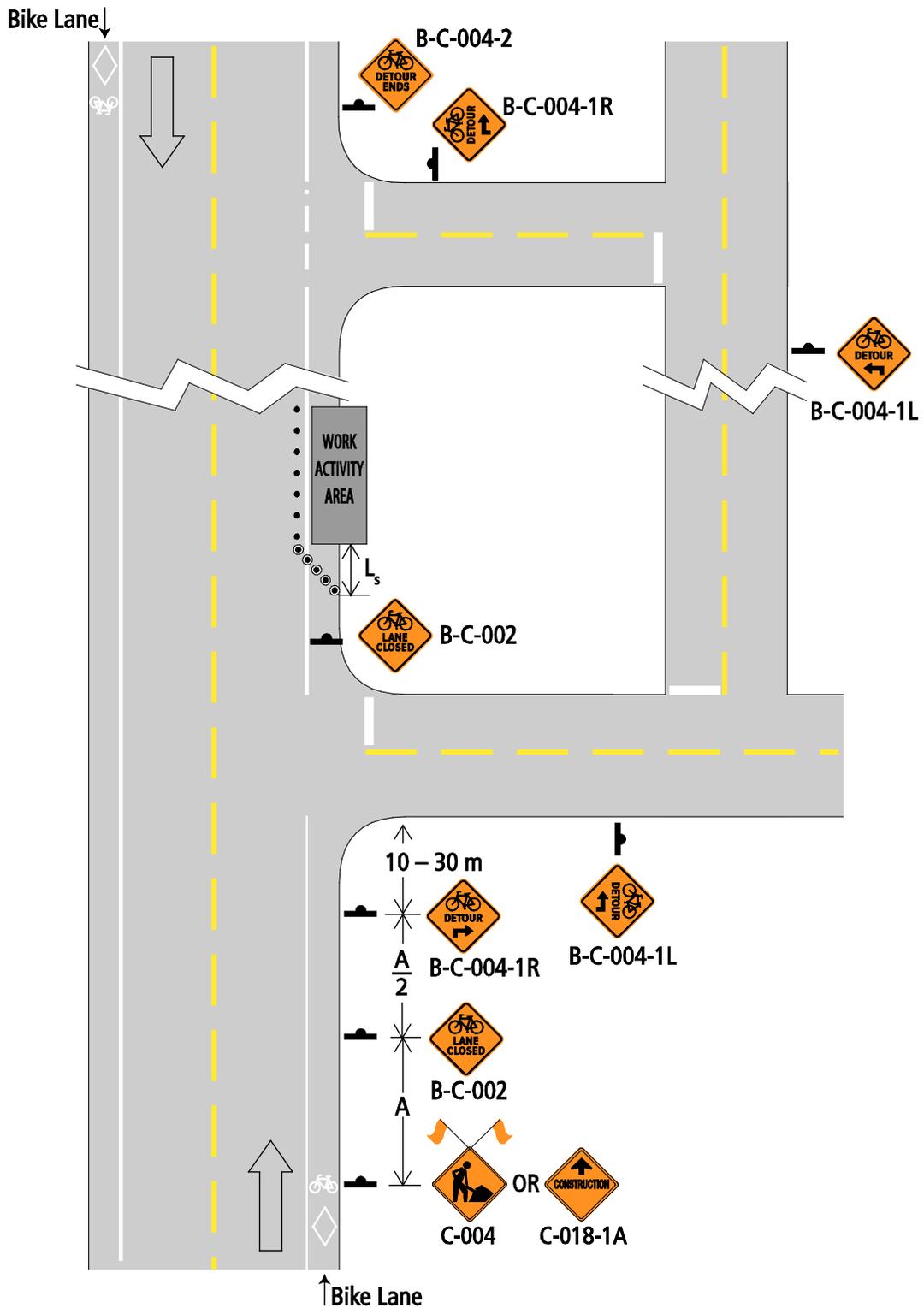
Guidance:

- Bicycle Detour Ahead B-C-004-1A signs should be used in advance of intersections along the route where the cyclist needs to continue straight ahead to stay on the detour route.
- Detours in which cyclists have to make left turns or cross arterial roadways without a signal or push-button crosswalk should be avoided.
- Detours for cyclists may not be possible on rural highways because there are few alternative routes, and detours may be lengthy. Other provisions should be considered, such as providing a shuttle service for cyclists.

Options:

- Bicycle Detour Ahead C-004-1A signs may be used along the detour route for confirmation.
- Where space allows, an additional Crew Working Ahead C-004 sign may be used in advance of the closure at a distance of one-half of Table B Distance A.

Figure 18.5: Bicycle Lane Closed – Bicycle Detour



18.6 Bicycle Lane Closed – Dismount and Walk

Purpose:

It is preferable for cyclists to continue cycling when work occurs on a bicycle route but certain conditions may prevent this, such as the nature of the road alignment or surface.

This layout shows a bicycle lane closure where cyclists must dismount and walk around the closure. This may be preferable to a bicycle detour if the closure length is relatively short (less than 50 metres). Cyclists will usually be dismounting and walking along a sidewalk. If a sidewalk is not present, the walking route must be marked with channelizing devices.

The layout illustrates a bicycle lane closure in a low-volume residential neighbourhood as a common example of where the “dismount and walk” requirement would probably occur. It is primarily intended to illustrate bicycle-related signage, but additional signage that is not bicycle-specific may also be required.

Standard:

- In advance of the work activity area, a confirmatory Bike Lane Closed B-C-002 sign with Cyclists Stop and Dismount B-R-101-Tb tab shall be used to direct cyclists to dismount.
- A Walk Bicycle B-R-101-2 sign shall be placed at the beginning of the area where cyclists shall walk. If a sidewalk is present, an On Sidewalk B-R-101-Tc tab should be used with the B-R-101-2 sign.

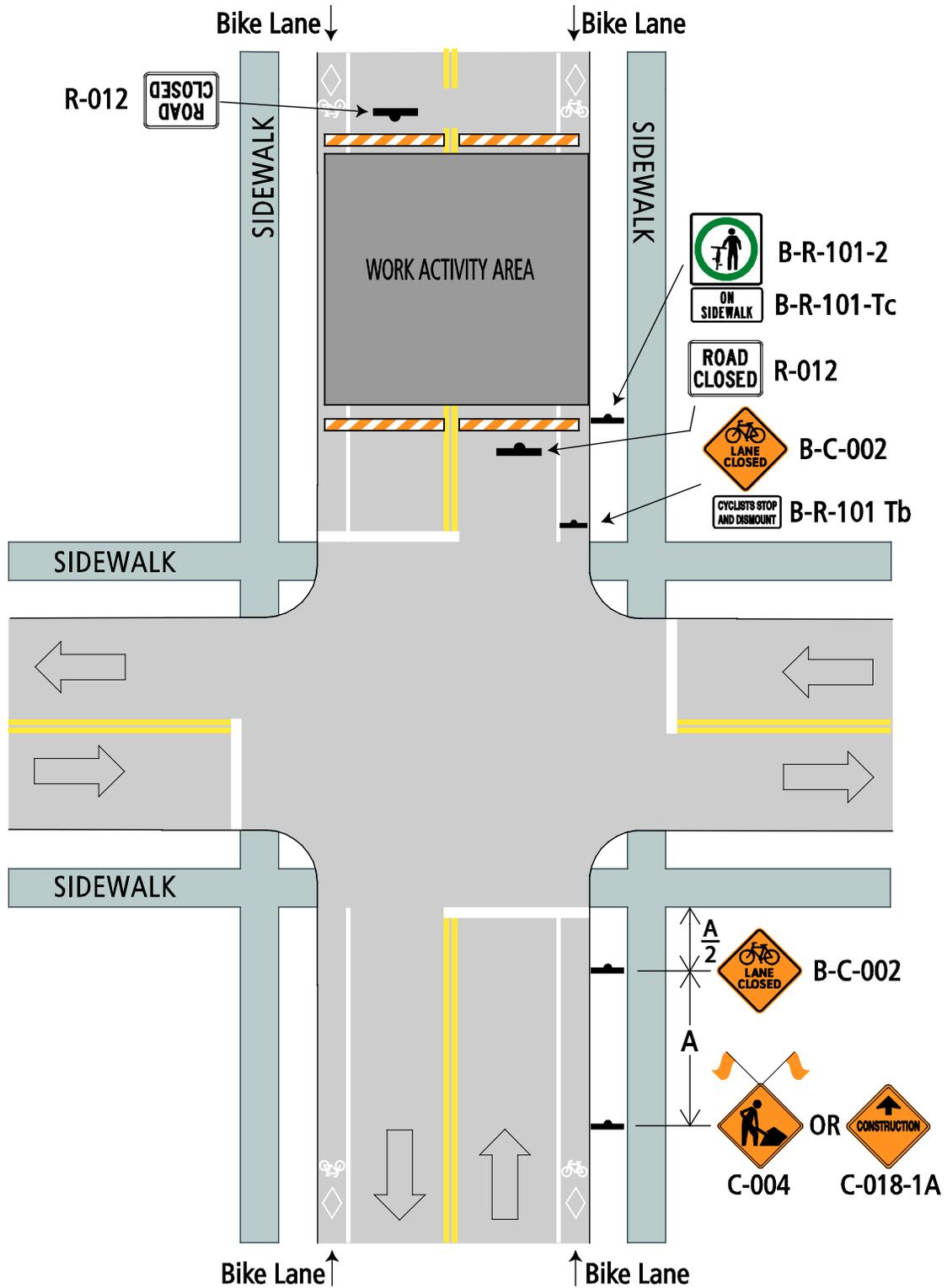
Guidance:

- If the reason for dismounting is not obvious, additional signage identifying the hazard should be installed (e.g., Loose Gravel C-015 sign).

Options:

- If cyclists are ignoring the requirement to dismount, a worker or Traffic Control Person near the dismount point may provide guidance to cyclists.

Figure 18.6: Bicycle Lane Closed – Dismount and Walk



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PART B– TRAFFIC CONTROL

Section 19: Traffic Control Layouts – Other Scenarios

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PART B – TRAFFIC CONTROL

Section 19: Traffic Control Layouts – Other Scenarios

LEGEND			
	Flexible Drum		Paint Truck
	Tubular Marker		Escort Truck
	Cone		Chaser Vehicle
	Sign		Vehicle Mounted Rear Crash Attenuator
	Traffic Control Person		
	Work Activity Area		360° Flashing Light
	Work Truck		Portable Traffic Signal
	Shadow Vehicle		Barricade and Fencing
	Shadow Vehicle #1		Flashing Arrow Board (FAB)
	Shadow Vehicle #2		Flashing Arrow Board (FAB) in caution mode
	Buffer Vehicle		Dynamic Message Sign (DMS)

TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

19.1 Tow Truck Recovery Operations

Purpose:

This section outlines the key issues that should be considered to maintain public and worker safety when recovering disabled vehicles on or near the roadway.

The effects of towing operations on traffic may be similar to the effects of construction activities so the appropriate traffic control layouts in Sections 7 to 18 should be used for tow truck recovery operations.

Standard:

All work vehicles shall have 360-degree flashing lights and 4-way flashers.

- When a vehicle incident is affecting the flow of traffic, or if recovery operations could affect traffic flow for more than 15 minutes, additional traffic control is required.
- The most appropriate traffic control layouts shall be applied for vehicle recovery operations which exceed 15 minutes in duration. These may include, but are not limited to, the following scenarios:
 - A disabled vehicle and tow truck are on the shoulder, and recovery operations will not impact traffic (see [Section 7.5: Work on Shoulder](#)).
 - A disabled vehicle and/or tow truck are on the shoulder but recovery operations are encroaching, or will encroach, into the travel lane (see [Section 7.7: Roadside Work – Encroachment into Travel Lane](#)).
 - A disabled vehicle and/or tow truck are in one lane of a two-lane, two-way roadway. Operators will have to determine which layout is most appropriate based on the anticipated duration of the recovery operations (see [Section 7.3: Emergent Work](#) or [Section 7.8: Lane Closure with TCPs – Single Lane Alternating](#)).
 - In [Section 8: Traffic Control Layouts – Multilane Undivided Roadways](#), see the Right Lane Closed, Left Lane Closed, and Centre Lane Closure subsections.
 - In [Section 9: Traffic Control Layouts – Multilane Divided Roadways](#), see the corresponding subsections.
 - In [Section 10: Traffic Control Layouts – Mobile Work](#), see the corresponding subsections.
 - Other references include layouts such as [Figure 6H-35 – Mobile Operation on a Multi-Lane Road](#) found in the U.S. Department of Transportation Federal Highway Administration’s [Manual on Uniform Traffic Control Devices](#)
- In addition to meeting WorkSafeBC requirements for personal protective equipment, those working on Provincial roadways shall comply with [Section 5.4.3: Apparel for Other Onsite Workers](#).

Guidance:

- For a recovery that does not pose a hazard to the travelling public but requires additional resources, it is important to secure and establish them before commencing the recovery operation. The requirements for this situation may include, but are not limited to:
 - additional traffic control signs and devices
 - Traffic Control Persons
 - special equipment
- A recovery that may encroach into the travel lane will probably require the closure of one or more lanes. This includes situations where:
 - The tow truck or disabled vehicle is fully or partially blocking a lane.
 - Tow truck equipment—cables, outriggers, cranes, and other equipment—is crossing, encroaching on, or operating above the travel lanes.

Options:

- For all the layouts in Sections 7 to 18 where a Crew Working Ahead C-004 sign or a Construction Ahead C-018-1A sign is required, an Accident Scene, Emergency Scene, Emergency Incident, or Tow Truck (C-058, C-070, C-071 series) sign with flags or a flashing light may be used instead.

19.2 Roadway Closure – No Through Road – Local Road

Purpose:

This layout shows a typical setup for a long duration local road closure where network street continuity is lost due to the closure. Advanced planning for detours is key to success as notifications, jurisdictional acceptance and/or the development of custom signs may be necessary. Emergency services (Police, Ambulance, Fire) may need to be contacted depending on the complexity of the closure (network of streets impacted), and overall length (time and distance) of detour.

Figure 19.2: Roadway Closure – No Through Road shows the general layout for a singular road closure.

Standard:

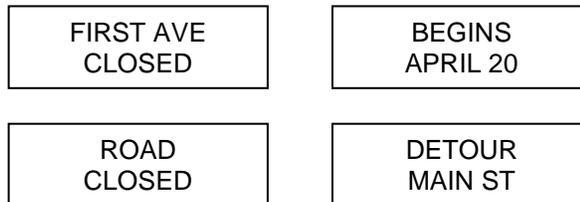
- All detours affecting provincial roadways and highways shall have a plan accepted by the Ministry.
- Before a road is closed to traffic, all necessary detour signs shall be in place along the corresponding detour route.
- Barricades shall span the entire width of the roadway.

Guidance:

- Regulatory traffic control devices should be added or modified as needed for the duration of the detour.
- Additional signs should be erected at all connecting roadways to provide clear guidance to alternative routes for connectivity.

Options:

- If the road is opened for some distance beyond the intersection and/or there are significant origin/destination points beyond the intersection such as residences, the Road Closed Local Traffic Only C-201 series sign and barricades may be located at the edge of the traveled way to allow local passage.
- A Checkerboard C-114 sign may be placed at the closure, just in front of, or as part of the barricade sign assembly. If the C-114 sign is used, the Road Closed R-012 sign may be mounted on the barricade or below the C-114 sign. The C-114 sign provides for better notification and stop compliance.
- If the road closure is some distance from the intersection, the Road Closed Ahead C-030-6A sign may be added to provide additional warning of the closure ahead.
- DMS messages may be used to provide enhanced information regarding the closure and detour. Typical messages are shown below:

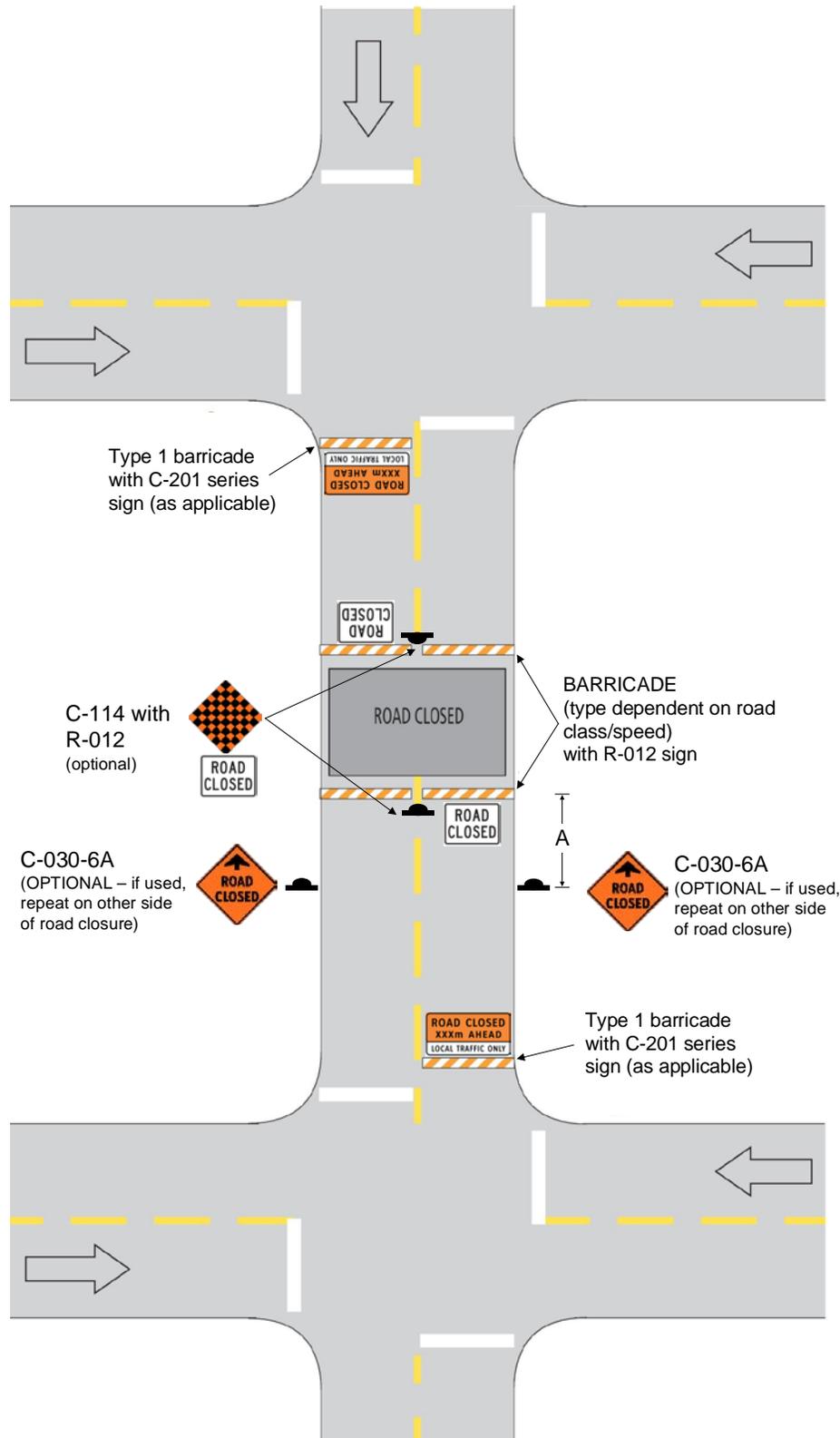


- If the road closure impacts a road commonly used to access a highway or a popular destination, additional signage may be required to establish a detour.
- The “LOCAL TRAFFIC ONLY” text of the Road Closed Local Traffic Only C-201 series signs may be replaced with custom messaging such as road closure times or dates to provide more information representing local conditions to the road user.
- Typical custom signage used in detours include the following examples:



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Figure 19.2: Road Closure – No Through Road – Local Road



19.3 Roadway Closure – Two-Lane, Two-Way Roadway

Purpose:

This layout shows a typical setup for a long duration road closure on two-lane, two-way roadways. Advance planning for road closures and detours is key to success as notifications, jurisdictional acceptance and/or the development of custom signs may be necessary. Emergency services (Police, Ambulance, Fire) may need to be contacted depending on the complexity of the closure (network of streets impacted), and overall length (time and distance) of detour.

Figure 19.3: Roadway Closure – Two-Lane, Two-Way Roadway shows the general layout for a two-lane, two-way road closure.

Standard:

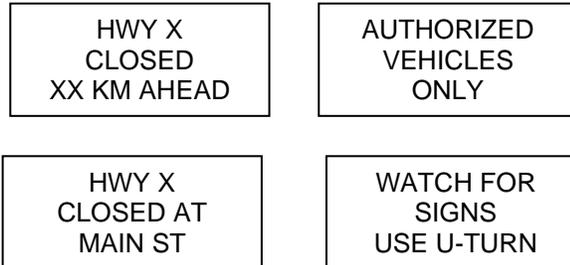
- All road closures and detours affecting provincial roadways and highways shall have a plan accepted by the Ministry.
- Before a road is closed to traffic, all necessary detour or U-turn signs shall be in place along the corresponding detour or U-turn route.
- Barricades (typically type 3) shall span the entire width of the roadway.

Guidance:

- Regulatory traffic control devices should be added or modified as needed for the duration of the closure.
- Speed limits for road closures should be established at 50 km/h.
- Advanced information should be provided. This information can be provided by several means:
 - 1) Portable DMS - messages at major intersections prior to the closure location
 - 2) Permanent Overhead DMS managed by the Transportation Management Centre of BC (TMCBC) – closure messages may be displayed up to several hundred kilometres from the closure location, depending on availability.
 - 3) Static Signs – custom messages at major intersections prior to the closure location
 - 4) DriveBC – all closures should be posted online
 - 5) Social media, radio, television (as required based on the complexity and duration of the situation)

Options:

- DMS messages may be used to provide enhanced information regarding the closure and detour. Typical messages are shown below:

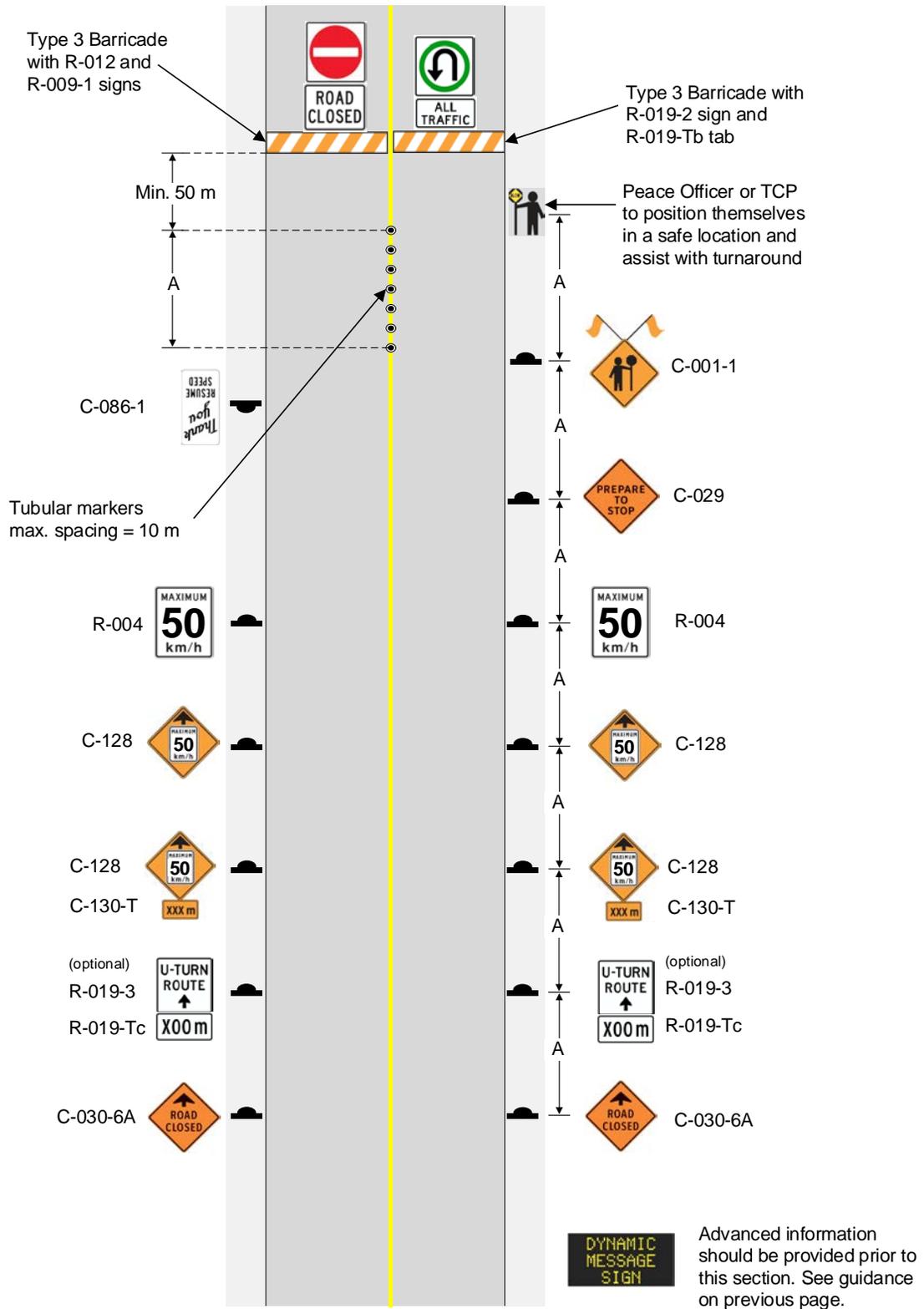


- A Checkerboard C-114 sign may be placed at the closure, just in front of, or as part of the barricade sign assembly. If the C-114 sign is used, the Road Closed R-012 sign may be mounted on the barricade or below the C-114 sign. The C-114 sign provides for better notification and stop compliance.
- The U-turn Route Ahead R-019-3 sign with R-019-Tc distance tab may be used to provide additional warning to drivers that there is an established U-turn location ahead.
- If the road closure impacts a road commonly used to access a highway or a popular destination, additional signage may be required to establish a detour.
- Typical custom signage includes the following examples:



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Figure 19.3: Roadway Closure – Two-Lane, Two-Way Roadway



19.4 Roadway Closure – Multilane Roadway

Purpose:

This layout shows a typical setup for a long duration road closure on a multilane roadway. Advance planning for road closures and detours is key to success as notifications, jurisdictional acceptance and/or the development of custom signs may be necessary. Emergency services (Police, Ambulance, Fire) may need to be contacted depending on the complexity of the closure (network of streets impacted), and overall length (time and distance) of detour.

Figure 19.4: Roadway Closure – Multilane Roadway shows the general layout for a multilane roadway.

Standard:

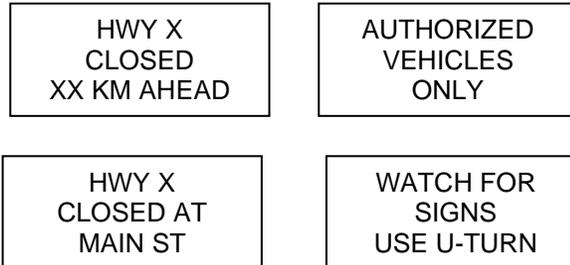
- All road closures and detours affecting provincial roadways and highways shall have a plan accepted by the Ministry.
- Before a road is closed to traffic, all necessary detour or U-turn signs shall be in place along the corresponding detour or U-turn route.
- Barricades (typically type 3) shall span the entire width of the roadway.

Guidance:

- Regulatory traffic control devices should be added or modified as needed for the duration of the closure.
- Speed limits for road closures should be established at 50 km/h.
- Advanced information should be provided. This information can be provided by several means:
 - 1) Portable DMS - messages at major intersections prior to the closure location
 - 2) Permanent Overhead DMS managed by the Transportation Management Centre of BC (TMCBC) – closure messages may be displayed up to several hundred kilometres from the closure location, depending on availability.
 - 3) Static Signs – custom messages at major intersections prior to the closure location
 - 4) DriveBC – all closures should be posted online
 - 5) Social media, radio, television (as required based on the complexity and duration of the situation)

Options:

- DMS messages may be used to provide enhanced information regarding the closure and detour. Typical messages are shown below:

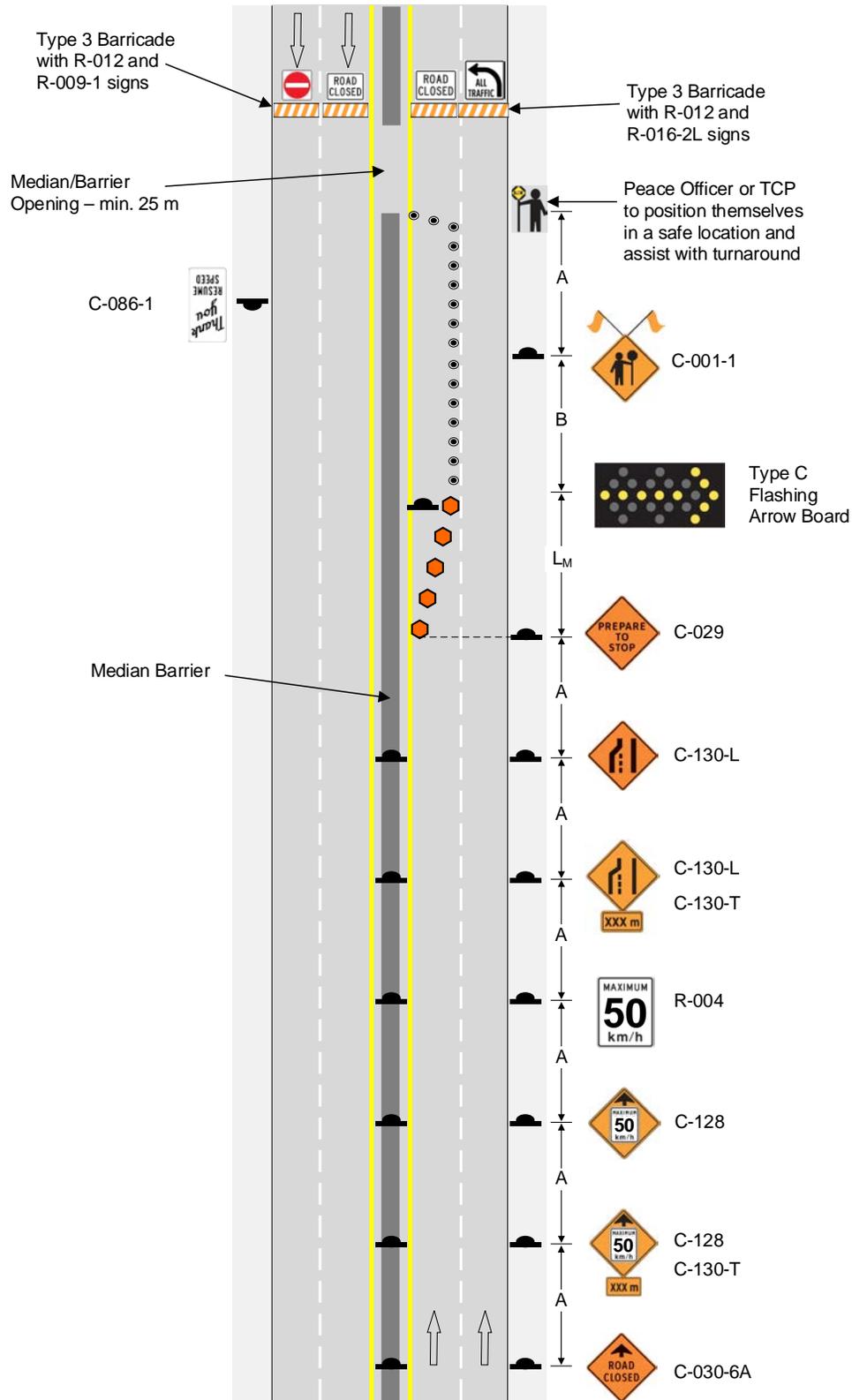


- A Checkerboard C-114 sign may be placed at the closure, just in front of, or as part of the barricade sign assembly. If the C-114 sign is used, the Road Closed R-012 sign may be mounted on the barricade or below the C-114 sign. The C-114 sign provides for better notification and stop compliance.
- The U-turn Route Ahead R-019-3 sign with R-019-Tc distance tab may be used to provide additional warning to drivers that there is an established U-turn location ahead.
- If the road closure impacts a road commonly used to access a highway or a popular destination, additional signage may be required to establish a detour.
- Typical custom signage includes the following examples:



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Figure 19.4: Roadway Closure – Multilane Roadway



19.5 Roadway Closure – Intersection (Signalized or Unsignalized)

Purpose:

This layout shows a typical setup for a long duration road closure at signalized or unsignalized intersections. Advance planning for road closures and detours is key to success as notifications, jurisdictional acceptance and/or the development of custom signs may be necessary. Emergency services (Police, Ambulance, Fire) may need to be contacted depending on the complexity of the closure (network of streets impacted), and overall length (time and distance) of detour.

Figure 19.5: Roadway Closure – Intersection (Signalized or Unsignalized) shows the general layout for a road closure at signalized or unsignalized intersections.

Standard:

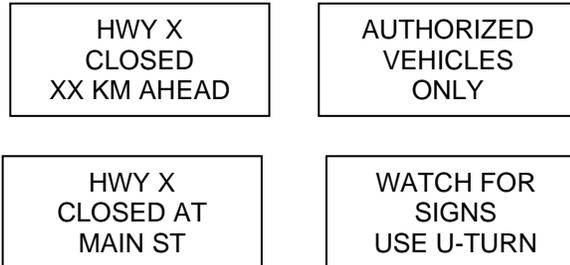
- All road closures and detours affecting provincial roadways and highways shall have a plan accepted by the Ministry.
- Before a road is closed to traffic, all necessary detour or U-turn signs shall be in place along the corresponding detour or U-turn route.
- Barricades (typically type 3) shall span the entire width of the roadway.

Guidance:

- At signalized intersections, traffic signals should be put into flash mode, turned off, or covered/bagged.
- Regulatory traffic control devices should be added or modified as needed for the duration of the closure.
- Speed limits for road closures should be established at 50 km/h.
- Advanced information should be provided. This information can be provided by several means:
 - 1) Portable DMS - messages at major intersections prior to the closure location
 - 2) Permanent Overhead DMS managed by the Transportation Management Centre of BC (TMCBC) – closure messages may be displayed up to several hundred kilometres from the closure location, depending on availability.
 - 3) Static Signs – custom messages at major intersections prior to the closure location
 - 4) DriveBC – all closures should be posted online
 - 5) Social media, radio, television (as required based on the complexity and duration of the situation)

Options:

- DMS messages may be used to provide enhanced information regarding the closure and detour. Typical messages are shown below:

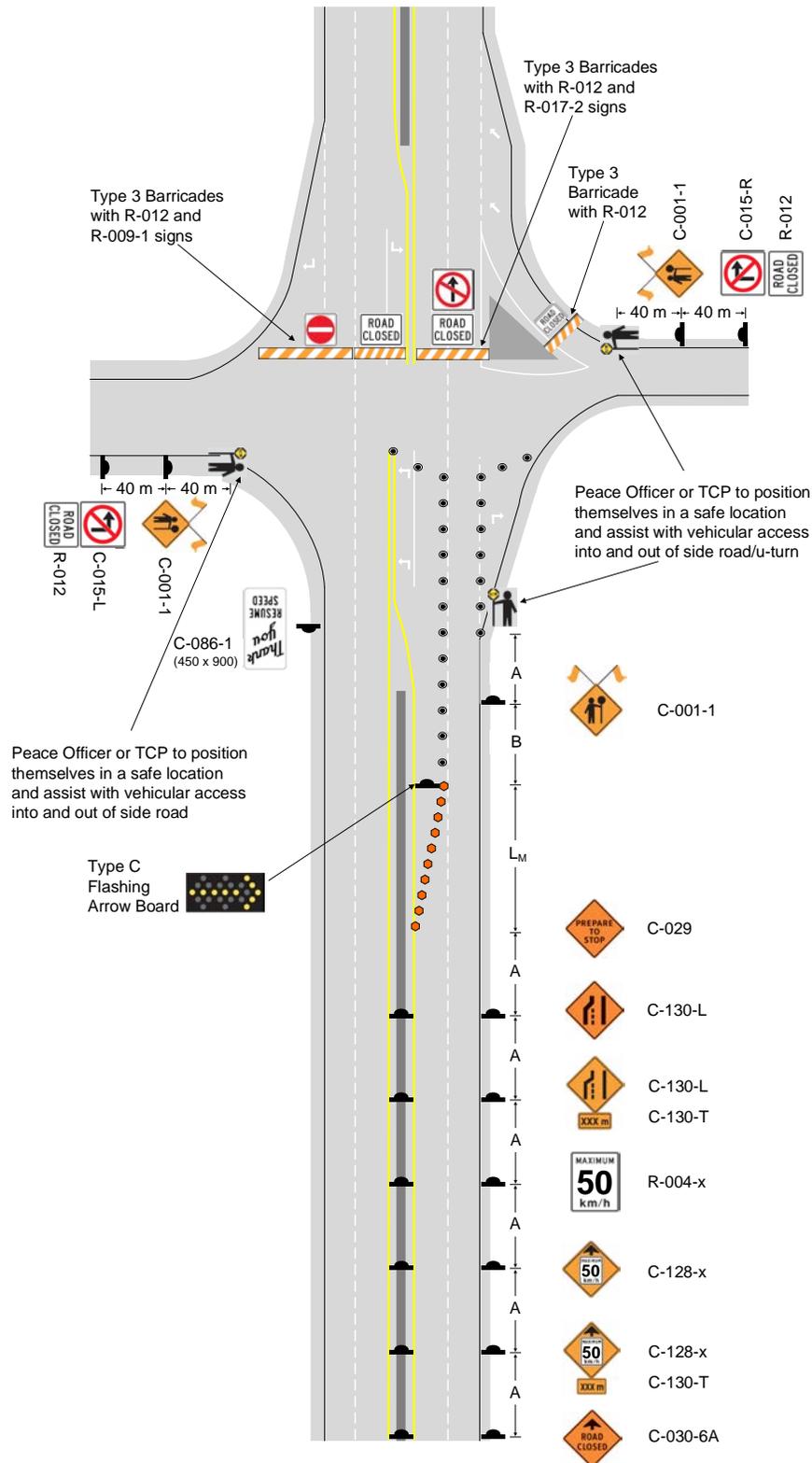


- A Checkerboard C-114 sign may be placed at the closure, just in front of, or as part of the barricade sign assembly. If the C-114 sign is used, the Road Closed R-012 sign may be mounted on the barricade or below the C-114 sign. The C-114 sign provides for better notification and stop compliance.
- If the road closure impacts a road commonly used to access a highway or a popular destination, additional signage may be required to establish a detour.
- Typical custom signage includes the following examples:



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Figure 19.5: Road Closure – Intersection (Signalized or Unsignalized)



19.6 Roadway Closure with Detour (≤ 60 km/h)

Purpose:

This layout shows a typical setup for a local street network where network street continuity is lost due to the closure of a street. Advance planning for detours is key to success, as in some cases using other jurisdictions streets or developing custom signs will be necessary. Getting acceptance from other jurisdictions or getting customized signs developed takes time, so lead time is key. Emergency services (Police, Ambulance, Fire) may need to be contacted depending on the complexity of the closure (network of streets impacted), and overall length (time and distance) of detour.

Standard:

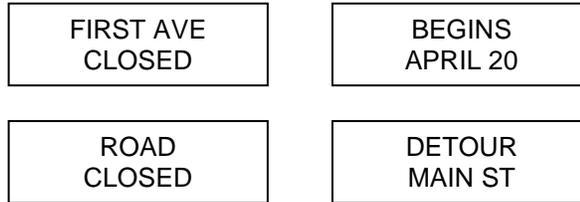
- All detours affecting provincial roadways and highways shall have a plan accepted by the Ministry.
- Before a road is closed to traffic, all necessary detour signs shall be in place along the corresponding detour route.

Guidance:

- Regulatory traffic control devices should be added or modified as needed for the duration of the detour.
- [*Figure 19.3: Roadway Closure with Detour \(\$\leq 60\$ km/h\)*](#) shows the general layout of detour signs. Additional detour signs should be erected at all connecting roadways to provide clear guidance.

Options:

- DMS messages may be used to provide enhanced information regarding the closure and detour. Typical messages are shown below:

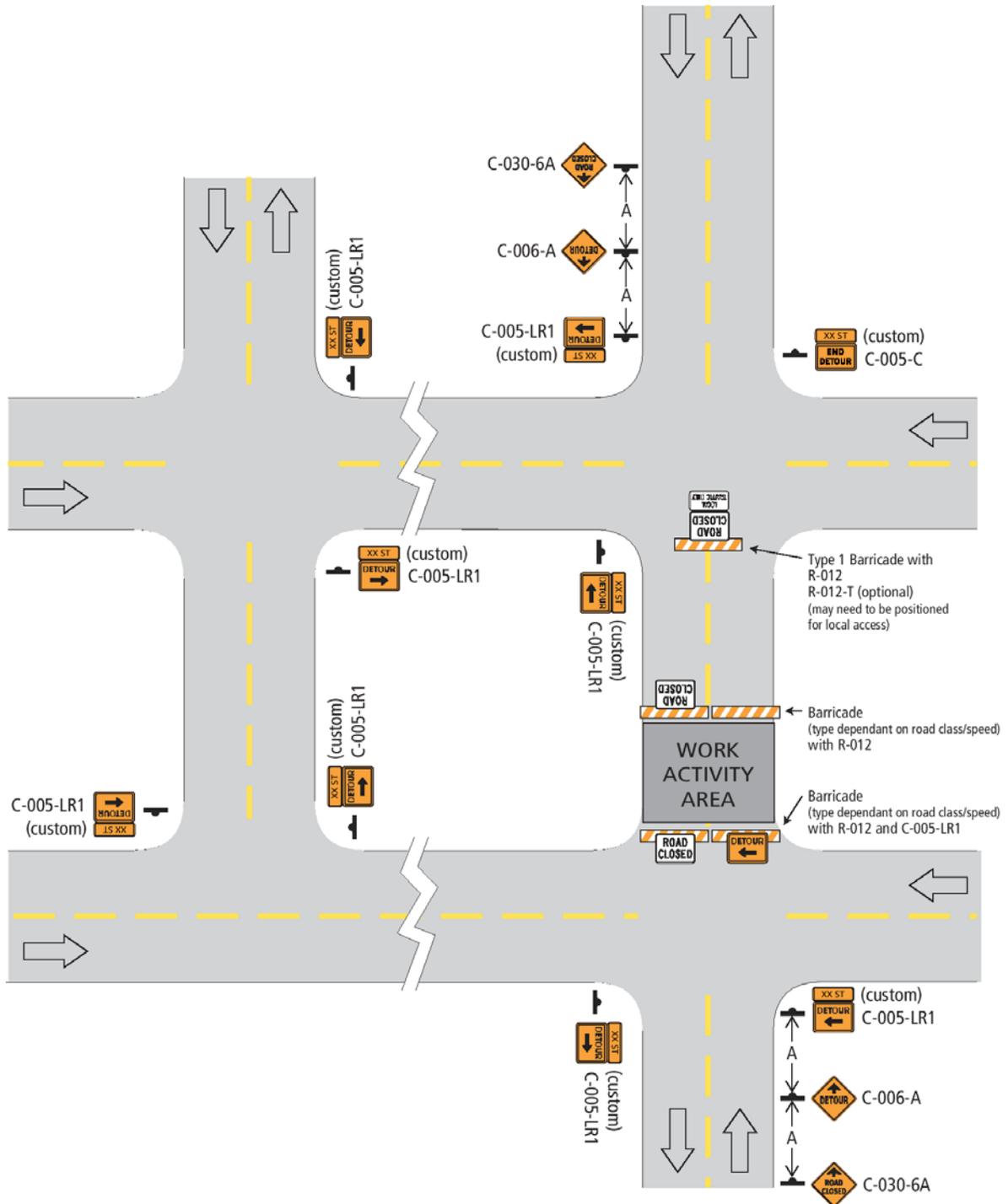


- If the road is opened for some distance beyond the intersection and/or there are significant origin/destination points beyond the intersection such as residences, the Road Closed R-012 and Detour C-005-LR1 signs on barricades may be located at the edge of the traveled way to allow local passage.
- If the road is opened for some distance beyond the intersection and/or there are significant origin/destination points beyond the intersection such as residences, a Road Closed Local Traffic Only C-201 series sign may be used in place of the Road Closed R-012 and Local Traffic Only R-012-T sign assembly on the barricade.
- A Street Name sign may be mounted with the Detour sign.
- Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
- If the road closure impacts a main collector route to a highway, detours may require route shields and the required direction arrows.
- Typical custom signage used in detours include the following examples:



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Figure 19.6: Roadway Closure with Detour (≤ 60 km/h)



19.7 Roadway Closure with Detour (≥ 70 km/h)

Purpose:

This layout shows a typical setup for a long duration highway closure, or main arterial closure where the highway is closed, or if a direction of the highway is closed for more than 3 days. A detailed traffic management plan will be required as advanced planning for detours is key to success, especially in cases where another jurisdiction’s roads, or the need to develop custom signs is necessary.

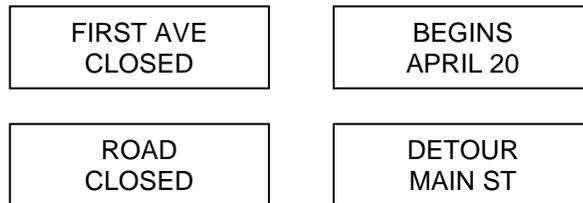
Obtaining acceptance from other jurisdictions or developing custom signs takes time, so lead time is key. Emergency services (Police, Ambulance, Fire) shall be contacted, as incident planning is required. Prior to a planned highway closure, information signs for road users shall be deployed.

Standard:

- All detours affecting provincial roadways and highways shall have a plan accepted by the Ministry.
- Before a road is closed to traffic, all necessary detour signs shall be in place along the corresponding detour route.

Guidance:

- A Traffic Management Plan including the four sub-plans should be developed (Traffic Control Plan, Incident Management Plan, Public Information Plan, and Implementation Plan).
- Advanced information signage regarding the detour should be in place at least 8 days prior to the detour opening, and may require longer notification for lengthy and complex detours.
- DMS messages should be used to provide enhanced information regarding the closure and detour. Typical messages are shown below:



- For long duration detours, signage should be placed on permanent structures such as telespar.
- Route shields and directional arrows should be placed to clearly direct all users through the detour route.
- Regulatory traffic control devices should be added or modified as needed for the duration of the detour.
- [Figure 19.4: Roadway Closure with Detour \(≥ 70 km/h\)](#) shows the general layout of detour signs. Additional detour signs should be erected at all connecting roadways to provide clear guidance.

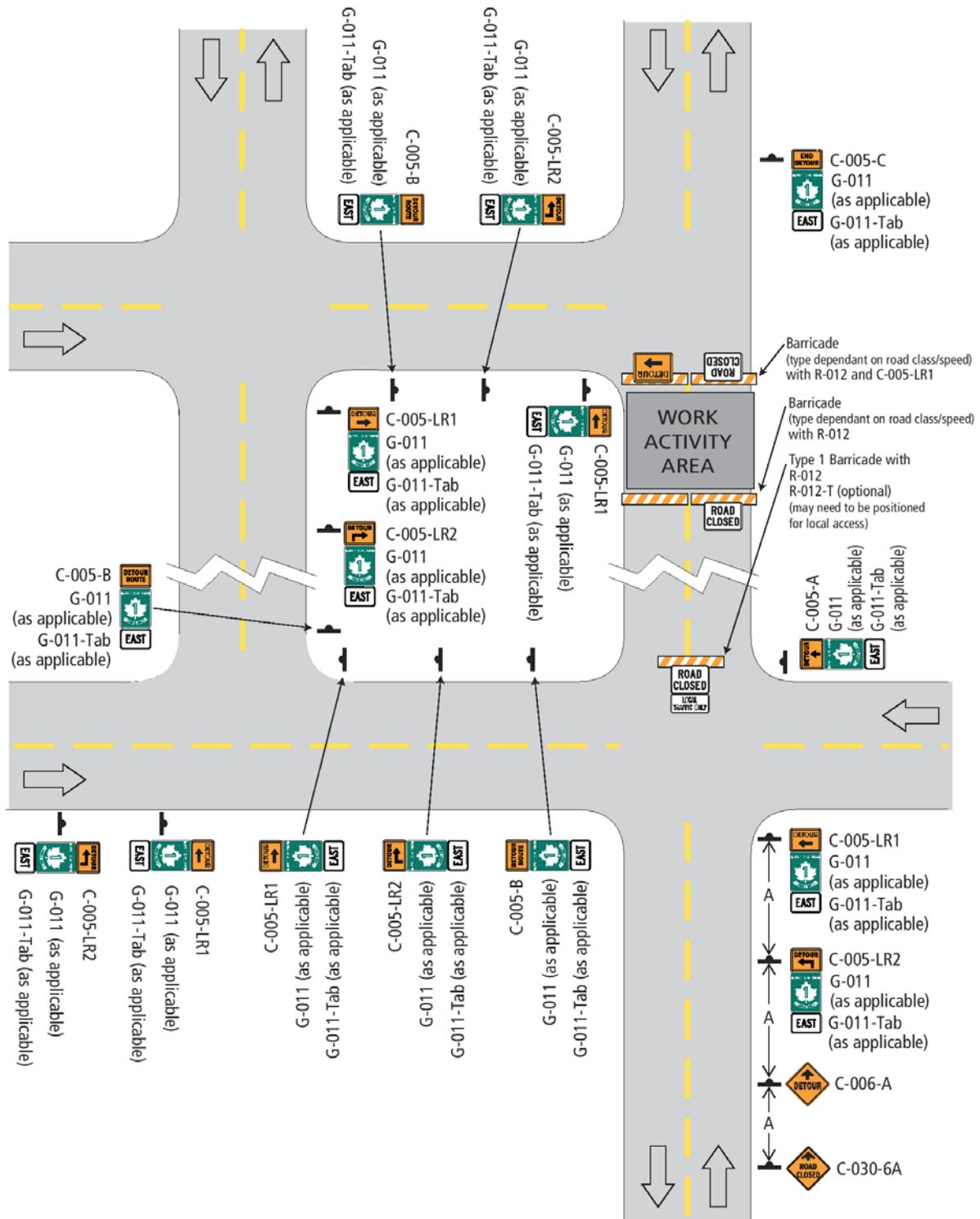
Options:

- Placement of detour signage on both sides of the road may be necessary for clearer guidance.
- When adding signs, utilizing the back of detour signs for one direction for the other will minimize the number of sign structures added.
- If the road is opened for some distance beyond the intersection where the detour begins and/or there are significant origin-destination points beyond the intersection such as commercial businesses, the Road Closed R-012 and Detour C-005-LR1 signs on Type 3 barricades may be located at the edge of the traveled roadway to allow local passage.
- If the road is opened for some distance beyond the intersection and/or there are significant origin/destination points beyond the intersection such as residences, a Road Closed Local Traffic Only C-201 series sign may be used in place of the Road Closed R-012 and Local Traffic Only R-012-T sign assembly on the barricade.
- Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
- Typical custom signage used in detours include the following examples:



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Figure 19.7: Roadway Closure with Detour (≥ 70 km/h)



19.8 Emergency Response

Purpose:

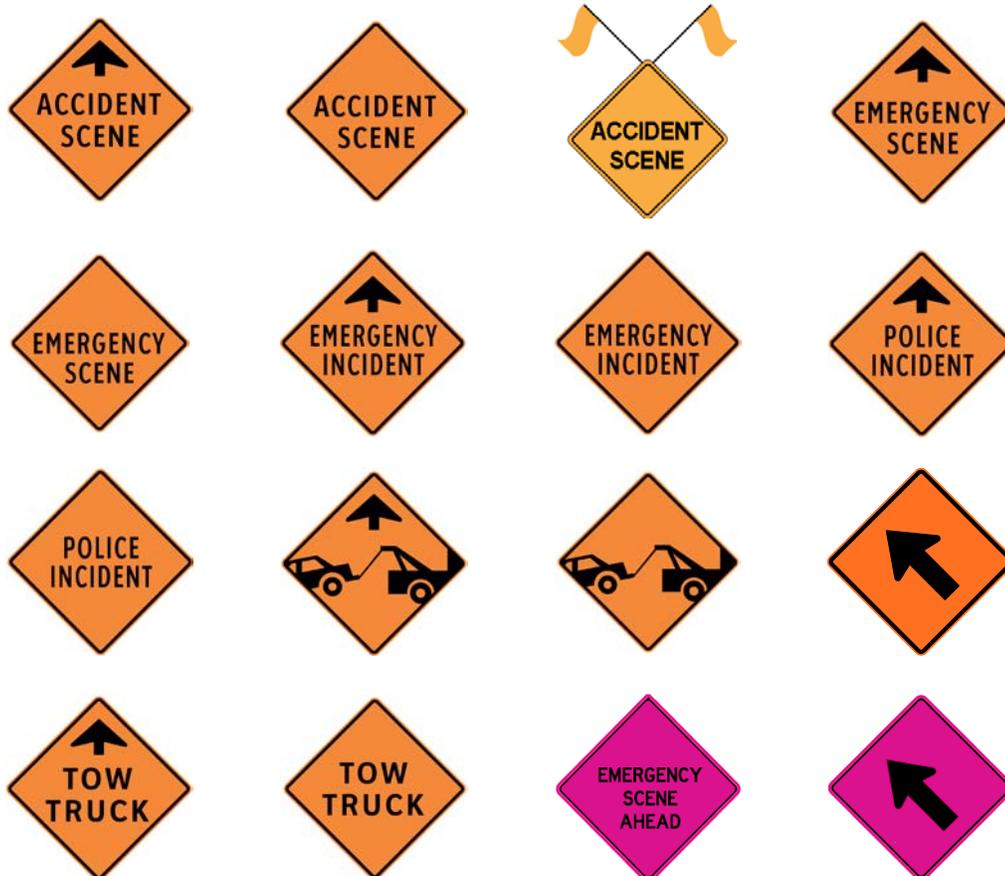
This layout shows a typical setup of signs that may be used by those who attend incidents prior to the arrival of planned and organized traffic management and traffic control. First responders may carry flexible signs that can be set up quickly using portable lightweight spring stands, or other appropriate temporary mounting at an incident site.

The purpose of the signs is to alert drivers that the temporary traffic control is a result of an emergency situation, to expect responders on the roadway, and to proceed with caution as full temporary traffic control may not yet have been established.

C-058 series signs used for emergency response can be either the Ministry’s standard retroreflective fluorescent orange or they may be the flexible roll-up retroreflective pink which some organizations have purchased.

Standard:

- Emergency response signs include the following:



Guidance:

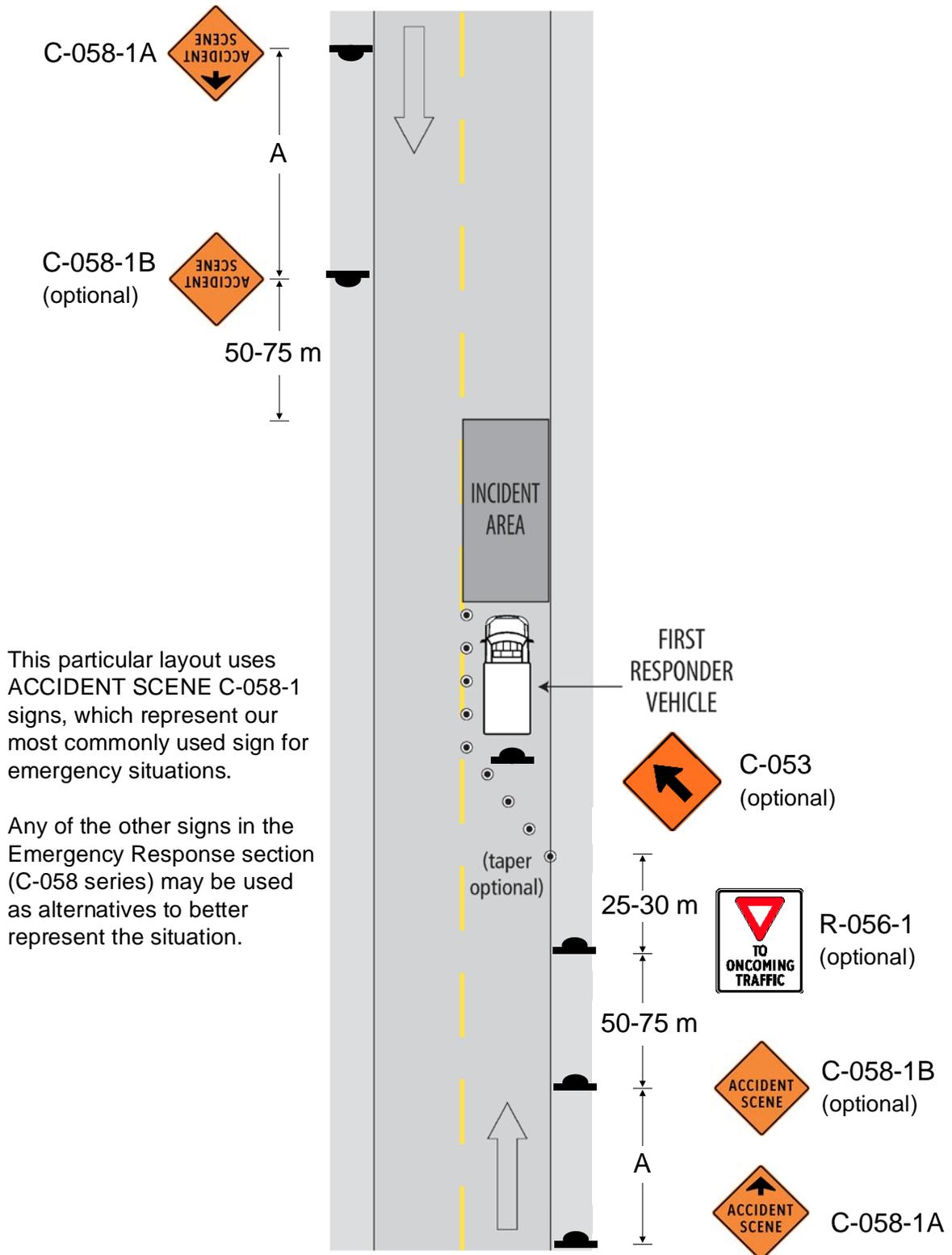
- First responders may carry rigid or flexible roll-up signs, using messages that coincide with their field activity. Default messages include Accident Scene C-058-1 or Emergency Scene C-058-2 series signs.
- Signs placed and positioned by first responders should follow the guidelines established in this Manual.
- Wind and vehicles can blow signs over. Therefore, signs should be placed on the shoulder of the road as far off the travelled portion of the road as reasonably possible.
- An unplanned event such as an emergency leads to a variety of activities taking place at the same time. Those responding to the emergency should only undertake traffic control activities if practical.

Options:

- The Accident Scene Ahead C-058-1A sign (or similar), and the Lane Closure Arrow C-053 sign (if used), should be placed on the shoulder of a roadway by a qualified first responder (fire, enforcement, ambulance, HAZMAT, or recovery) in advance of the incident scene.
- Accident Scene Ahead C-058-1A signs should be placed in both directions so that they will provide enough warning for vehicles to slow down before reaching the incident scene. Placement of an advance warning sign for situations near a corner, hill, or other reduced visibility situations, may require the placement to be adjusted.
- The Accident Scene C-058-1B sign (or similar) may be used to provide additional warning for vehicles to slow down before reaching the incident scene.
- Where the road user is required to navigate around an incident, the Lane Closure Arrow C-053 sign should be placed. If no cones are utilized, the directional arrow sign should be placed in a location which provides enough separation for road users to navigate around the incident.
- If the Lane Closure Arrow C-053 sign is used, it should be placed sufficiently far back from the incident to allow motorists to both see beyond the incident, and easily manoeuvre around the incident.
- If the Lane Closure Arrow C-053 sign is used, it should be located to close off the approach to the incident scene. For example, if the incident is contained within a travel lane, it should be placed at the midpoint of the lane, or towards the centre line or lane line.
- If the incident is blocking a travelled lane on a two-lane two-way roadway, the Lane Closure Arrow C-053 sign requires the addition of the Yield to Oncoming Traffic R-056-1 sign, as the Lane Closure Arrow C-053 sign would otherwise be directing traffic into the opposing lane.

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Figure 19.8: Emergency Response



This particular layout uses ACCIDENT SCENE C-058-1 signs, which represent our most commonly used sign for emergency situations.

Any of the other signs in the Emergency Response section (C-058 series) may be used as alternatives to better represent the situation.

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Appendix A: Glossary

Contents

A.1	Terms	A-1
A.2	Acronyms ¹	A-15

¹ For sign acronyms and abbreviations, see [Section 4.2: Traffic Signs](#) and [Section 4.3: Dynamic Message Signs](#).

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Appendix A: Glossary

A.1 Terms

active work	When workers and equipment are present on the construction site.
barricade	A frangible device that is relatively forgiving when struck by an errant vehicle. It is normally placed at or nearly at right angles to approaching traffic to provide visual identification of hazardous locations and to delineate travel paths.
barrier	A device typically filled with water, or concrete, and designed to contain and deflect errant vehicles at a small angle, thereby preventing them from entering a closed or hazardous area. It is normally placed parallel to or nearly parallel to approaching traffic.
bicycle lane	A lane designated for bicycle use, and may be marked with both a diamond and a bicycle symbol.
brief-duration work	Work that is generally planned in nature, but for which the extent of the work required or the location may not be fully known. The total time to complete brief-duration work is less than 15 minutes.
buffer space	<p>The longitudinal distance which provides a margin of safety for both the driver and the workers. It is important that the buffer space be free of equipment, workers, material and vehicles.</p> <p>A buffer vehicle with a crash attenuator may be located within the buffer space if there are space constraints.</p> <p>The buffer space is measured is from the end of the taper to the work activity area unless there is a buffer vehicle, in which case it is measured to the back of the buffer vehicle.</p> <p>See also Section 6.2.4: Work Zone Components – Buffer Space.</p>
buffer vehicle	A vehicle positioned in the buffer space in advance of a work activity area to enhance worker safety. It is usually stationary, and shall be equipped with a 360-degree flashing yellow light and 4-way flashers, or a flashing arrow board (FAB)
changeable message sign	See “dynamic message sign” in this Glossary .

chase vehicle	A separate traffic control vehicle used in a rolling slowdown operation, following the slowest or last public vehicle ahead of the blockade (see Section 10.6: Rolling Slowdown).
clear zone	From the Ministry's BC Supplement to the Transportation Association of Canada's Geometric Design Guide: The total roadside border area—starting at the edge of the travel lane—that is available for errant vehicles. A clear zone may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area.
construction speed limit	The speed limit (unchanged or reduced) in the work zone during construction activities or other temporary/special events.
Construction Speed Zone	A lowered legal speed zone authorized by the Road Authority, normally through a long-duration work zone.
continuously slow-moving work	Work that is continuously moving such that the use of normal traffic control procedures is impracticable. This can include stops of up to 15 minutes. Examples include hydro-seeding, spraying for dust control, grading, mowing, brushing, flushing, striping, and sweeping.
conventional pavement marking	<p>A form of pavement marking in which the paint dries slowly (drying time is 5 minutes or more), and from which paint could be tracked into travel lanes by vehicles driving over the marking. It requires advance warning signage and protection of the painted area by using signs, cones, barricades, and other devices until the paint is dry.</p> <p>See also "quick-dry pavement marking" in this Glossary and Section 14.1: General Information on pavement marking.</p>
detour route	<p>A travel route that takes traffic off the normal route and uses existing roadways or new temporary roadways to guide traffic around a work zone, identified by appropriate detour signs.</p> <p>At least one week prior to closing a roadway and opening a detour, it is advisable to erect "Closing Notice" signs at strategically selected locations.</p>
directional dividing line	<p>A yellow line that separates traffic traveling in opposite directions.</p> <p>Directional dividing lines are also used to mark the left edge line of divided highways and one-way roadways, including portions of highway ramps, and to mark both sides of two-way left-turn lanes.</p>

divided roadway	Roadway separated by median barrier (concrete, cable and W-beam), depressed median (≥ 4 metres wide), raised channelization with curb (≥ 2 metres wide), or landscaping with curb.
downstream	<p>Like the flow of a river, a location away from a present location, in the direction of vehicular travel.</p> <p>See also “upstream” in this Glossary.</p>
drawings	<p>Scale diagrams of the roadway in the vicinity of the work zone that identify the planned arrangement of traffic control devices in accordance with this Manual.</p> <p>Drawings include dimensions and show all painted markings and physical features (signs, no-post guardrail, lamp standards, etc.) that may affect traffic operations, roadway geometry, and lane configurations.</p>
drop-off	<p>An abrupt change in the road level created by construction activities—such as milling, paving, or excavating—that is steeper than 3:1 (i.e., a non-traversable slope).</p> <p>See also Section 6.5: Treatment of Drop-Offs and Travel Lane Excavations.</p>
dynamic message sign	<p>A programmable traffic control device that displays messages composed of letters, symbols/graphics, or both, and is used to provide drivers with highway condition information or to warn or manage traffic.</p> <p>The acronym for dynamic message sign is DMS. It may also be called a changeable message sign (CMS) or a variable message sign (VMS).</p> <p>See also Section 4.3: Dynamic Message Signs.</p>
emergency	Situation which requires immediate response to save lives or prevent serious injury using whatever resources are available.
emergent work	<p>Unplanned, quick-response work necessitated by an unanticipated situation that presents a risk to road users.</p> <p>Each entry onto the travelled portion of the highway to perform emergent work takes less than 1 minute, and the total time required to complete the work is less than 5 minutes. (This does not apply for emergency incidents.)</p>

escort vehicle	<p>A vehicle used in quick-dry paint operations on two-lane, two-way roadways as a warning device to the travelling public.</p> <p>Typically driven ahead of the paint truck, it carries supplies, transports personnel between job sites, and communicates information about highway conditions, hazards, and traffic flow to other vehicles involved in the painting operation.</p>
flagging	<p>The control/direction of traffic using Automated Flagger Assistance Devices (AFADs) or Traffic Control Persons (TCPs).</p>
flasher	<p>A yellow flashing warning light.</p>
freeway	<p>A divided primary highway with two or more lanes in each direction and access via grade-separated interchanges only. Posted speed limit is typically 100 km/h or higher.</p>
guidance	<p>Uses words such as should, recommended - describes a recommended, but not mandatory, practice. Decisions contrary to guidance are documented.</p> <p>See Section 6.11: Using Sections 7 to 19.</p>
high speed	<p>A speed of 70 km/h or higher.</p> <p>See also “low speed” in this Glossary.</p>
high-volume roadway	<p>During work, a roadway which carries 1,000 or more vehicles per day.</p> <p>See also “low-volume roadway” in this Glossary.</p>
highway	<p>Every road, street, lane or right of way designed or intended for or used by the general public for the passage of traffic.</p>
Implementation Plan	<p>A sub-plan within a Traffic Management Plan that identifies the designated Traffic Control Manager and Traffic Control Supervisor and their qualifications, responsibilities, and duties, as well as procedures for ensuring that traffic management sub-plans are implemented in a coordinated manner (see Section 3: Traffic Management Plans).</p>
inactive work site	<p>A portion of roadway or right-of-way on which work has commenced but has temporarily ceased, and which has not been returned to normal operating conditions.</p>
incident	<p>In the context of Traffic Management, an incident refers to an event which affects Traffic Operations for workers and/or the travelling public, such as a collision which occurs within the construction zone.</p>

Incident Management Plan	<p>A sub-plan within a Traffic Management Plan that documents a plan for detecting incidents and managing incident response operations (see Section 3: Traffic Management Plans).</p> <p>It includes priorities and procedures for incident detection, response actions that will restore traffic flow as quickly as possible, and a review and analysis process for reducing incident frequency and severity.</p>
intermittently-moving work	<p>A road maintenance activity with a frequently changing work zone (e.g., some mowing operations) or one that involves frequent stops that last 30 minutes or less (temporary patching, group re-lamping of street lights, Benkleman beam testing, crack sealing, etc.).</p>
isolated pothole patching	<p>The patching of one or two potholes within a 1 km length of roadway.</p> <p>See also “multiple pothole patching” in this Glossary.</p>
lane closure	<p>One (or more than one) lane of traffic is closed to traffic use in one or both directions but the entire road has a minimum of one lane available for the passage of traffic for each direction.</p>
Lane Closure Request Form	<p>The Ministry’s “Work Notification/Lane Closure Request and Approval Form” that is completed by the Prime Contractor and submitted to the District Manager of Transportation for acceptance. It identifies the proposed work zone location and traffic control measures, and is the minimum level of documentation required from the Prime Contractor.</p> <p>See Appendix E: Lane Closure Request Form for a sample of the form and a link to it.</p>
lane drop	<p>The closure of a through lane by using appropriate temporary traffic control devices, including flashing arrow boards and merge tapers.</p>
layout	<p>A schematic diagram of the roadway showing the placement and general arrangement of traffic control devices.</p> <p>See also Section 3.2: Traffic Management Sub-Plans and the traffic control layouts in Sections 7 through 19.</p>
line-type utility vehicle	<p>A vehicle carrying personnel who are working on utility lines, such as power, phone, or fibre optic lines.</p>

long-duration work	<p>Planned work that occupies one location for more than one daylight period. Night work lasting more than 15 minutes is also considered long-duration work.</p> <p>See also “short-duration work” in this Glossary.</p>
low speed	<p>A speed of 60 km/h or less.</p> <p>See also “high speed” in this Glossary.</p>
low-volume roadway	<p>During work, a roadway which carries fewer than 1,000 vehicles per day.</p> <p>See also “high-volume roadway” in this Glossary.</p>
Manual	<p>This Traffic Management Manual for Work on Roadways (TMM).</p>
may	<p>Describes a permissive condition. It is optional and carries no requirement or recommendation.</p>
Ministry	<p>The British Columbia Ministry of Transportation and Infrastructure, which is the provincial government entity responsible for work on Provincial roadways and right-of-way.</p> <p>When Ministry responsibilities are identified in this Manual, municipal Road Authorities may have similar responsibilities for work on municipal roads and right-of-way.</p>
mobile work	<p>Continuously slow-moving work or intermittently-moving work, with short stops of 30 minutes or less. The traffic control devices for mobile work are typically vehicle-mounted.</p>
multilane divided roadway	<p>A roadway with two or more travel lanes in each direction, including passing or climbing lanes, where the directions of travel are physically separated by a physical barrier.</p>
multilane roadway	<p>A roadway with two or more travel lanes in at least one direction, including climbing and passing lanes.</p>
multiple pot-hole patching	<p>The patching of multiple clusters of potholes along a stretch of roadway such that the work crew needs to stop several times in succession within 1 kilometre. It is a type of mobile work.</p> <p>See also “isolated pothole patching” in this Glossary.</p>
near miss	<p>In the context of Traffic Management, a near miss refers to an event where abrupt corrective action is required in order to avoid a collision. This unplanned event did not result in injury, illness, or damage, but had the potential to do so.</p>

option	Uses words such as may - describes a permissive condition. It is optional and carries no requirement or recommendation. See Section 6.11: Using Sections 7 to 19
pilot car	For the purposes of this Manual, a vehicle marked with warning signs and lights that is used to guide a queue of vehicles through a work zone or detour (sometimes called “pilot vehicle”). (For links to information on piloting extraordinary loads, see the websites cited at the beginning of Section 4.11.9: Pilot Cars for Work Zones).
pilot vehicle operation delay	The amount of time elapsed when a vehicle joins the back of the queue until it passes by the traffic control device (e.g. traffic control person) to follow the pilot vehicle.
platoon	A group of vehicles or pedestrians travelling together, either voluntarily or involuntarily, because of traffic signal controls, other traffic control devices, road geometrics, or other factors.
portable signal	See “temporary traffic control signal” in this Glossary .
Prime Contractor	The organization directly constructing or maintaining works on a Provincial highway and responsible for: <ul style="list-style-type: none">• obtaining Ministry authorization to carry out the works• developing an acceptable Traffic Management Plan• implementing the Plan in accordance with Ministry requirements
project	A work operation or activity undertaken on a roadway or right-of-way and requiring temporary traffic control.
project category	A project classification (Category 1, 2, or 3) based on the project’s anticipated effect on traffic operations and the traffic control required for the works (see Section 3: Traffic Management Plans).
Public Information Plan	A sub-plan within a Traffic Management Plan that identifies actions and procedures for informing the travelling public, project stakeholders, and Ministry staff of current traffic operations and planned changes to traffic operations (see Section 3: Traffic Management Plans).
quality assurance	A process which ensures the Prime Contractor is following their Quality Control Plan.

quality control	An inspection process that examines the effectiveness of the temporary traffic control. It is the responsibility of the Prime Contractor.
Quality Control Plan	A plan which documents the Prime Contractor's quality control inspection process.
queue clearing time	The minimum amount of time that the highway must remain open to clear queued traffic and restore free-flow operation prior to implementing a subsequent Road Closure.
quick-dry pavement marking	A form of pavement marking in which the paint dries rapidly (typically in 90 seconds or less), and where paint is not tracked into the travel lanes by vehicles driving over the marking. See also "conventional pavement marking" in this Glossary and Section 14.1: General Information - Pavement Marking .
random minor traffic interruption(s)	A very brief stoppage in traffic in one or more directions for construction activities.
regular posted speed limit	The posted speed limit of the highway prior to any planned work. This is the speed limit the Ministry has established through the H-223 form, as signed by the Chief Engineer.
Road Authority	The jurisdiction that is responsible for operating the road. For Provincial jurisdictions, the Road Authority is typically the District Manager of Transportation or delegate.
roadside diversion	A deviation from the normal roadway where a section of the road is closed by road works and a short detour is therefore required, usually within the right-of-way, to bypass the work activity area.
roadway	The portion of a street or highway that is normally used for vehicular traffic. The roadway excludes the shoulder.
road closure(s)	A stoppage of traffic in one or both directions for the purpose of blasting rock, tie-ins, girder erection and paving activities, etc.
road users	Anyone who uses or crosses a road, including but not limited to vehicles, cyclists, pedestrians, and mobility devices. See also "traffic" in this Glossary .
roll-ahead buffer distance	The longitudinal distance measured from the front of the buffer vehicle to the work activity area. It provides a margin of safety in case of impact.

scheduled stoppage	A stoppage of traffic in one or both directions.
shadow vehicle	A vehicle used primarily in slow-moving operations as a mobile advance warning and sign support device. It may travel on the roadway or on the shoulder.
shall	<p>Describes a mandatory condition.</p> <p>For provincial highways, if a mandatory condition cannot be met, contact Traffic and Highway Safety Engineering - Policy and Standards for direction.</p>
short-duration work	<p>Planned work which occupies one location for more than 15 minutes during a single daylight period.</p> <p>See also “long-duration work” in this Glossary.</p>
should	<p>Describes a recommended, but not mandatory, practice. Decisions contrary to a “should” are required to be documented. The documentation process is discussed in Section 6.11.2: Application of Sections 7 to 19.</p> <p>See also “guidance” in this Glossary.</p>
shoulder	<p>That part of a roadway contiguous with the travelled way intended for emergency stopping, and/or lateral support of the roadway structure. It may also be configured to be accessible for pedestrian and bicycle use.</p> <p>Typically the paved area outside of the highway’s painted lane edge (fog lines). If not painted, the area outside the typical travel lane width of 3.5 to 3.7 metres.</p>
simple project	A Category 1 or Category 2 project which may not require an Incident Management Plan, or a Public Information Plan, and for which no specific risk issues have been identified (see Section 3: Traffic Management Plans).
single lane alternating traffic (SLAT)	<p>A traffic control practice typically used on a two-lane, two-way roadway whereby one direction of traffic is held while the other is permitted to proceed, and then vice versa.</p> <p>This process is repeated successively so that traffic continues to flow with minimal delays. It is a method acceptable to Road Authorities because delays are typically less than 5 minutes.</p>

speed limit	<p>Regular posted speed limit – The posted speed limit of the highway prior to any planned work. This is the speed limit the Ministry has established through the H-223 form, as signed by the Chief Engineer.</p> <p>Construction speed limit – The speed limit (unchanged or reduced) in the work zone during construction activities.</p>
spot obstruction	<p>A roadway hazard that is less than a car length in size, such as debris on the road, a manhole, or a sink hole.</p>
stakeholders	<p>Individuals and organizations using the roadway or affected by the road project or works.</p>
standard	<p>In terms of the TMM, the standard written in this Manual establishes technical criteria, methods, processes and practices.</p> <p>Minimum standards are represented in this manual for controlling traffic through highway work zones. Implementation of standards usually uses words such as shall, required, or must.</p> <p>Several typical situations are illustrated to show the recommended application of standard devices for planned, scheduled work on roadways.</p> <p>See Section 6.11: Using Sections 7 to 19.</p>
steep grade	<p>A grade greater than or equal to 6%.</p>
stop bar	<p>A solid white line, normally 30 cm to 60 cm (12" to 24") wide, extending across one or more lanes to indicate the point behind which vehicles are required to stop.</p>
street	<p>A public road used for the movement of vehicles within a municipal area.</p>
tangent distance	<p>The distance between the end of one taper and the beginning of the next for the same direction of travel.</p>
taper	<p>For a lane or shoulder closure, the gradual narrowing of the lane or shoulder using successive channelizing devices to safely guide drivers into the next lane.</p>
taper length	<p>For a lane or shoulder closure, the taper distance along a section of roadway required to achieve the full closure of the lane or shoulder.</p>

Temporary Speed Zone	A temporarily lowered legal speed limit installed in a short-duration work zone at the discretion of the Supervisor and signed with Crew Working C-002 signage.
temporary stop bar	A solid white line, minimum 10” wide, which helps define the stop location in advance of a TCP.
temporary traffic control signal	<p>A set of red, yellow, and green lights on the road or in an intersection used to temporarily control the flow of vehicles and/or pedestrians. It may be a portable signal.</p> <p>The design specifications for temporary signals shall be pre-approved by the Road Authority.</p>
traffic	<p>Includes pedestrians, ridden or herded animals, vehicles, cycles and other conveyances, either singly or together, while using a highway to travel.</p> <p>See also “road users” in this Glossary.</p>
traffic control	The effective use of temporary traffic control devices to protect workers and move road users safely through a work zone. Traffic Control is implemented using a Traffic Management Plan.
Traffic Control Manager	<p>The individual designated by the Prime Contractor to prepare, implement, and manage the Traffic Control Plan.</p> <p>It may be the Prime Contractor’s employee or sub-contractor, and it may be the Traffic Control Supervisor for simple projects.</p>
Traffic Control Person	A person trained and certified in a manner acceptable to WorkSafeBC to direct traffic through a work zone while ensuring the safety of public traffic and workers as defined by Part 18 of WorkSafeBC’s Occupational Health and Safety Regulation.
Traffic Control Plan	<p>A sub-plan within a Traffic Management Plan that documents how traffic control will be achieved (see Section 3: Traffic Management Plans).</p> <p>It includes a combination of text, layouts, and drawings (if required) that define specifically what traffic control measures and devices will be provided for the project, how they will be implemented, and on what schedule.</p>

Traffic Control Supervisor	<p>The individual designated by the Prime Contractor to supervise traffic control and personnel.</p> <p>If the Traffic Control Supervisor acts as a Traffic Control Person, they shall have TCP certification in order to assume the duties of a TCP and direct traffic.</p> <p>If the Traffic Control Supervisor is designated to ensure the requirements of Part 18.4 - Supervision in WorkSafeBC's Occupational Health and Safety (OHS) Regulations are met, they are required to be adequately trained in a manner acceptable to WorkSafeBC. See WorkSafeBC's Occupational Health and Safety (OHS) Guidelines.</p>
traffic delay	See "vehicle delay" in this Glossary , unless otherwise specified.
Traffic Engineer	A Professional Engineer licensed by the Engineers and Geoscientists British Columbia (EGBC) and qualified and experienced in traffic management planning and highway safety.
traffic flow	The movement of road users/traffic on the highway. Typically this refers to the measurement of vehicular flow. However, depending on the location and numbers, other modes of transportation may also be measured.
traffic management	The strategies designed to safely mitigate the impact of construction, rehabilitation, maintenance, incident management and special events on roadways to maintain traffic mobility and worker safety. The documentation of strategies is completed using a Traffic Management Plan.
traffic management strategy	See "traffic management" in this Glossary .
Traffic Management Plan	<p>The Prime Contractor's project-specific plan that details the strategies for protecting workers and safely and efficiently moving road users through the work zone, including any requirements of the Road Authority.</p> <p>It includes one or more of the following sub-plans, integrated into a single document that demonstrates an understanding of the site-specific issues and project requirements:</p> <ul style="list-style-type: none">• Traffic Control Plan• Incident Management Plan• Public Information Plan• Implementation Plan
traffic operations	The use of traffic control devices to maintain traffic flow on a highway.

traffic space	The portion of roadway on which traffic is routed through the work zone (see Figure 6.1: Overview of the Six Work Zone Components).
traffic volume	The number of vehicles within a certain amount of time. It is generally provided as Average Annual Daily Traffic (AADT) or Average Daily Traffic (ADT). It most often represents vehicular counts unless otherwise specified.
travel time	Time interval a vehicle and/or pedestrian and/or cyclist (ie. all road users impacted), or platoon requires to traverse the area under control, or the project limits.
two-lane, two-way roadway	A two-way roadway with one through lane in each direction.
undivided roadway	Roadway where there is no physical separation between the directions of travel that would prevent vehicles from travelling from one side of the roadway to the other.
upstream	Like the flow of a river, the location in front of a present location, against the direction of vehicular traffic. See also “downstream” in this Glossary .
utility	An organization that supplies a basic utility service, such as electricity, natural gas, water, or fibre optic service.
variable message sign	See “dynamic message sign” in this Glossary .
vehicle	In terms of the TMM, vehicle represents vehicular traffic best described as either a passenger car or commercial vehicle/truck.
vehicle delay	Time interval from the first vehicle being stopped at a traffic control point to the resumption of travel.
vehicles per day (vpd)	The expected number of vehicles per day on the highway during the period of time that work takes place. See also “traffic volume” in this Glossary .
work	The undertaking with the use of equipment or personnel of construction, rehabilitation, maintenance, incident management, or special events on or near a roadway that may impact road users.

work activity area

The specific area within a work zone where active work is taking place (see [Section 6.1: Introduction to Work Zone Components](#) and [Section 6.2.5: Work Activity Area](#)). It typically involves the presence of workers and equipment.

Several work activity areas may exist within a given work zone, some separated even by several kilometres.

work zone

An area of roadway or right-of-way where road users are warned of potentially changing conditions through to the resumption of regular traffic flow.

These changing conditions are typically associated with construction, maintenance, utility work, temporary/special events, or with a situation requiring emergency incident management on or alongside the roadway (see [Section 6.1: Introduction to Work Zone Components](#) and [Section 6.2: Work Zones Components](#)).

The work zone is typically defined to extend from the first traffic control device to the last traffic control device as seen by the travelling public.

A.2 Acronyms¹

AADT	Average Annual Daily Traffic (both directions)
AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic (both directions)
AFAD	Automated Flagger Assistance Device
ASTM	American Society for Testing and Materials
CF	Counter-Flow Lane within Work Zone
CMB	Concrete Median Barrier
CMS	Changeable Message Sign
CRB	Concrete Roadside Barrier
DMI	Distance Measuring Instrument
DMS	Dynamic Message Sign
DMT	District Manager of Transportation
DT	Day-Time Work
DTN	Day-Time Work with Traffic Control Devices in Place at Night
FAB	Flashing Arrow Board
FHWA	Federal Highway Administration (USA)
FR	Flame Resistant
GPS	Global Positioning System
HOV	High-Occupancy Vehicle
LED	Light-Emitting Diode
LKI	Landmark Kilometre Inventory
LoC	Limits of Construction
MASH	AASHTO's Manual for Assessing Safety Hardware
MoT	Ministry of Transportation and Infrastructure
MUTCD	Manual of Uniform Traffic Control Devices (USA)
NCHRP	National Cooperative Highway Research Program (USA)

¹ This Manual generally avoids using acronyms to ensure clarity for non-Ministry users.

Appendix A.2 defines acronyms commonly found in other Ministry publications, as well as the few that are used in the Manual.

NT	Night-Time Work
PTS	Portable Traffic Signal
RPM	Raised Pavement Marker
RTE	Regional Traffic Engineer
RTMC	Regional Traffic Management Centre
SLAT	Single Lane Alternating Traffic
SSD	Stopping Sight Distance
STE	Senior Traffic Engineer
STOE	Senior Traffic Operations Engineer
TAC	Transportation Association of Canada
TCM	Traffic Control Manual for Work on Roadways
TCP	Traffic Control Person
TMCBC	Transportation Management Centre of British Columbia
TMG	Traffic Management Guidelines for Work on Roadways
TMM	Traffic Management Manual for Work on Roadways ²
TMP	Traffic Management Plan
TOM	Temporary Overlay Marker
VMS	Variable Message Sign
WZ	Work Zone

² This Manual.

Appendix B: Standard Construction Signs

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¹ The signs provided in Appendix B are commonly used in construction applications. Additional signs are available in the Ministry's Catalogue of Standard Traffic Signs, accessible online at <https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/traffic-engineering-safety/traffic-signs-markings#catalogue>

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Appendix B: Standard Construction Signs

See also Section 4.2: Traffic Signs.

B.1 Sign Illustrations at a Glance

Appendix B.1 shows standard signs used temporarily for construction, maintenance, and utility work.

For detailed information on these signs, see [Appendix B.2: Sizes and Applications of Individual Signs](#).

B.1.1 Construction and Maintenance Signs



C-001-1
C-001-1xx



C-001-2



C-002-1
C-002-1x



C-002-1 OL
C-002-1 OL-x



C-002-2
C-002-2x



C-002-2 OL
C-002-2 OL-x



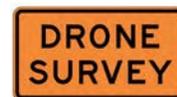
C-002-3
C-002-3x



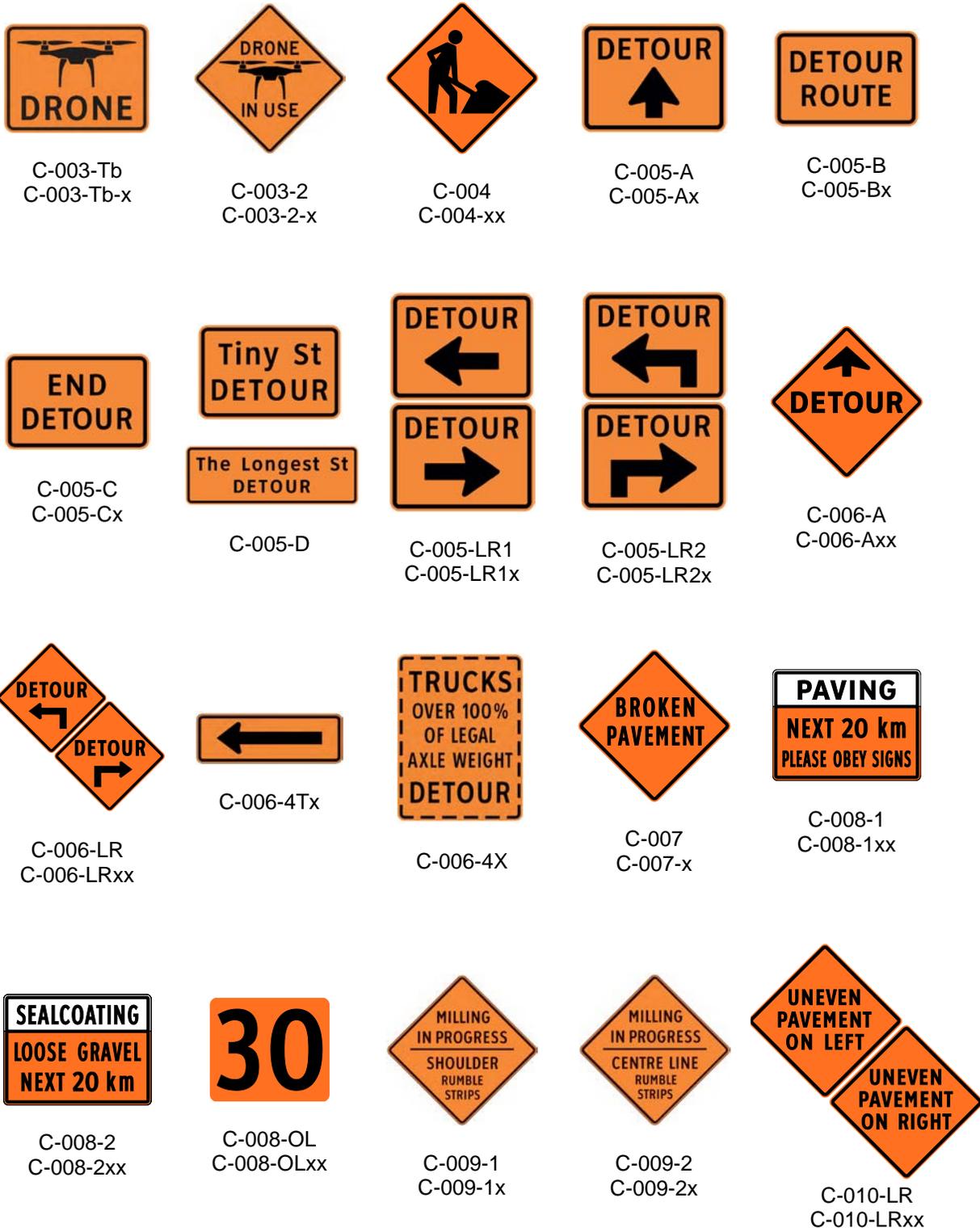
C-003
C-003-x



C-003-A
C-003-A-x



C-003-Ta
C-003-Ta-x





C-011
C-011-xx



C-011-T
C-011-Txx



C-012
C-012-x



C-013-LR
C-013-LRxx



C-014
C-014-x



C-015
C-015-x



C-016
C-016-x



C-017-1
C-017-1x
C-017-1xx



C-017-2A
C-017-2Ax
C-017-2Axx



C-017-2B
C-017-2Bx
C-017-2Bxx



C-017-3L
C-017-3Lx
C-017-3Lxx



C-017-3R
C-017-3Rx
C-017-3Rxx



C-018-1A
C-018-1Axx



C-018-2A
C-018-2Axx



C-018-3A
C-018-3Axx



C-018-4A
C-018-4Ax



C-018-6A
C-018-6Ax
C-018-6Axx



C-018-7
C-018-7x
C-018-7xx



C-018-8A
C-018-8Ax



C-018-8L
C-018-8Lx
C-018-8Lxx



C-018-8R
C-018-8Rx
C-018-8Rxx



C-018-9
C-018-9x



C-019



C-019-T



C-020-1LR
C-020-1LRx



C-020-2L
C-020-2Lx



C-020-2R
C-020-2Rx



C-022
C-022-x
C-022-xx



C-024
C-024-x
C-024-xx



C-027



C-028
C-028-xx



C-029
C-029-xx



C-030-1A
C-030-1Axx



C-030-2
C-030-2xx



C-030-3A
C-030-3Axx



C-030-4A
C-030-4Axx



C-030-5AL
C-030-5ALxx



C-030-5AR
C-030-5ARxx



C-030-6A
C-030-6Axx



C-030-7A
C-030-7Axx



C-030-8
C-030-8xx



C-030-14
C-030-14x
C-030-14xx



C-030-15
C-030-15x
C-030-15xx



C-031
C-031-x



C-032
C-032-xx



C-033
C-033-x



C-034
C-034-x



C-036



C-037-1
C-037-2



C-038
C-038-xx



C-039
C-039-x



C-040D



C-041-xx



C-042-LR



C-042-SLR



C-043



C-044-xx



C-045-1A
C-045-1Axx



C-045-2A
C-045-2Axx



C-046
C-046-x



C-047-1
C-047-1x



C-047-2
C-047-2x



C-048-1-DS



C-048-2



C-049
C-049-x



C-050-1
C-050-1x



C-050-2
C-050-2x



C-051
C-051-x



C-052-L
C-052-Lxx



C-052-R
C-052-Rxx



C-053
C-053-xx



C-057
C-057-x



C-058-1A
C-058-1Ax
C-058-1Axx



C-058-1B
C-058-1Bx
C-058-1Bxx



C-058-2A
C-058-2Ax
C-058-2Axx



C-058-2B
C-058-2Bx
C-058-2Bxx



C-058-3A
C-058-3Ax
C-058-3Axx



C-058-3B
C-058-3Bx
C-058-3Bxx



C-058-4A
C-058-4Ax
C-058-4Axx



C-058-4B
C-058-4Bx
C-058-4Bxx



C-059-1
C-059-1x



C-059-2
C-059-2x



C-061
C-061-x
C-061-xx



C-062
C-062-x
C-062-xx



C-063
C-063-xx



C-064
C-064-xx



C-066
C-066-xx



C-067
C-067-x
C-067-xx



C-067-T
C-067-Tx
C-067-Txx



C-069
C-069-x



C-070-1
C-070-1x
C-070-1xx



C-070-2
C-070-2x
C-070-2xx



C-071-1
C-071-1x
C-071-1xx



C-071-2
C-071-2x
C-071-2xx



C-072
C-072-xx



C-074
C-074-x



C-076
C-076-x



C-078
C-078-x



C-079-1A
C-079-1Ax
C-079-1Axx



C-079-1B
C-079-1Bx
C-079-1Bxx



C-079-2A
C-079-2Ax
C-079-2Axx



C-079-2B
C-079-2Bx
C-079-2Bxx



C-079-3A
C-079-3Ax
C-079-3Axx



C-079-3B
C-079-3Bx
C-079-3Bxx



C-080-Ta
C-080-Tax
C-080-Taxx
C-080-Taxxx



C-080-TB
C-080-TBx
C-080-TBxx
C-080-TBxxx



C-082
C-082-xx



C-084
C-084-x



C-085-1
C-085-1x



C-085-2L
C-085-2Lx



C-085-2R
C-085-2Rx



C-085-3L
C-085-3Lx



C-085-3R
C-085-3Rx



C-086-1



C-086-2



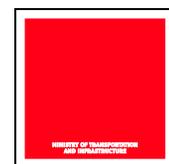
C-088
C-088-x



C-089
C-089-x
C-089-xx



C-090



C-092



C-111
C-111-x



C-112
C-112-x



C-114
C-114-x



C-115
C-115-x



C-116
C-116-x



C-117-L
C-117-Lx
C-117-Lxx



C-117-R
C-117-Rx
C-117-Rxx



C-118-L
C-118-Lx
C-118-Lxx



C-118-R
C-118-Rx
C-118-Rxx



C-119-L
C-119-Lx
C-119-Lxx



C-119-R
C-119-Rx
C-119-Rxx



C-121-1



C-121-1Ta



C-121-1Tb



C-128



C-129-L
C-129-Lx
C-129-Lxx



C-129-R
C-129-Rx
C-129-Rxx



C-130-L
C-130-Lx
C-130-Lxx



C-130-R
C-130-Rx
C-130-Rxx



C-130-Ta
C-130-Tax
C-130-Taxx

				
C-130-Tb C-130-Tbx C-130-Tbxx	C-132 C-132-x	C-134 C-134-xx	C-135 C-135-x	C-135-Ta C-135-Tax
				
C-136-L C-136-Lx	C-136-R C-136-Rx	C-137-1 C-137-1x	C-137-2 C-137-2x	C-137-5L C-137-5L-x
				
C-137-5R C-137-5R-x	C-137-7 C-137-7x C-137-7xx	C-137-8 C-137-8x C-137-8xx	C-138-L	C-138-R
				
C-138-Ta	C-138-Tb	C-138-Tc	C-138-Td	C-138-Te



				
C-185-1Ta C-185-1Ta-x	C-185-1Tb C-185-1Tb-x	C-185-2 C-185-2x	C-185-2Ta C-185-2Ta-x	C-185-2Tb C-185-2Tb-x
				
C-185-3 C-185-3x	C-185-4A C-185-4Ax C-185-4Axx	C-185-4B C-185-4Bx C-185-4Bxx	C-187 C-187-x	C-187-T C-187-Tx
				
C-190 C-190-x	C-190-TaA C-190-TaA-x	C-190-TaLR C-190-TaLR-x	C-201-1 C-201-1x	C-201-2 C-201-2x
				
C-201-3 C-201-3x	C-202 C-202-x C-202-xx	C-203-L C-203-Lx C-203-Lxx	C-203-R C-203-Rx C-203-Rxx	C-204



C-205-A
C-205-Ax
C-205-Axx



B-C-002



B-C-004-1A



B-C-004-1L



B-C-004-1R



B-C-004-2



B-C-004-Ta



B-C-004-Tb



B-C-004-Tc



B-C-020



B-C-020-T

B.1.2 Regulatory Signs



R-001
R-001-x
R-001-xx



R-001-Ta
R-001-Tax
R-001-Taxx



R-001-Tb
R-001-Tbx
R-001-Tbxx



R-001-Tc
R-001-Tcx
R-001-Tcxx



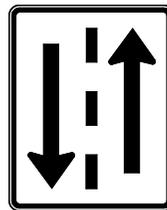
R-002
R-002-x



R-003
R-003-x
R-003-xx



R-004
R-004-x
R-004-xx



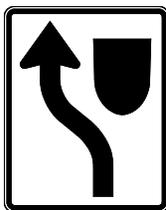
R-010



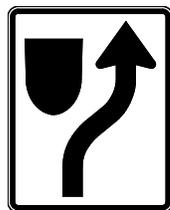
R-012
R-012x
R-012xx



R-012-T



R-014-L



R-014-R



R-015-L
R-015-Lx
R-015-Lxx



R-015-R
R-015-Rx
R-015-Rxx



R-016-2
R-016-2Lx



R-016-2R
R-016-2Rx



R-017-2



R-018
R-018-x



R-019-1
R-019-1x
R-019-1xx



R-019-2
R-019-2x
R-019-2xx



R-019-3
R-019-3x
R-019-3xx



R-019-Ta
R-019-Tax
R-019-Taxx



R-019-Tb
R-019-Tbx
R-019-Tbxx



R-019-Tc
R-019-Tcx
R-019-Tcxx



R-019-Td
R-019-Tdx
R-019-Tdxx



R-020
R-020-x



R-022-1
R-022-1x
R-022-1xx



R-023
R-023-x
R-023-xx



R-025-L



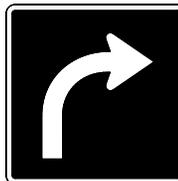
R-025-R



R-056-1
R-056-1x



R-082-L
R-082-Lx



R-082-R1
R-082-R1x



R-082-R2u
R-082-R2
R-082-R2x



R-083-L



R-083-R



B-R-101-1



B-R-101-2



B-R-101-Tb



B-R-101-Tc

B.1.3 Other Signs



P-081-1



P-081-2



P-081-Ta



P-081-Tb



P081-Tc



W-132-1u
W-132-1
W-132-1x



W-132-1Tu
W-132-1T
W-132-1Tx



C-186



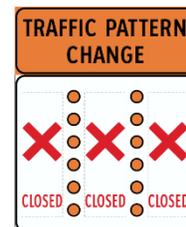
C-186-Ta



C-326
Hinged



C-326-OL
Series



Zx-030



Note: Those wishing to use Z series signs on Provincial roadways shall first obtain Ministry permission and the Ministry's specification sheets.

B.2 Sizes and Applications of Individual Signs

Appendix B.2 provides:

- images of traffic signs
- dimensions of each sign in millimetres
- intended use of each sign

Sign sizes used in work zones should not be smaller than those normally required on the roadway.

Sign sizes are related to the roadway type—local road, low-speed road, arterial road, expressway, or freeway. Refer to the Ministry's [Catalogue of Traffic Signs](#) for specific sizes based on the sign and roadway type. Generally:

- Smaller dimensions apply to urban roadways where the regular posted speed is ≤ 60 km/h.
- Larger dimensions apply to rural roadways with a regular posted speed limit of ≥ 70 km/h, provided that there is sufficient room to accommodate the larger signs.
- Multilane divided roadways typically use oversized signs on both the right and the left side of the roadway. Signs erected on the left side may be erected in a closed lane, shoulder, or median. If sufficient width is not available on the left shoulder or median, a smaller sized sign may be used.

Sign Sizes Marked with Asterisk (*)

Sign sizes marked with an asterisk (*) may not be in the Ministry's Catalogue of Standard Traffic Signs. Confirm appropriate sign sizes for specific roadways and work activities.

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B.2.1 Construction and Maintenance Signs

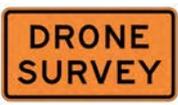
Construction signs are used to give notification of a roadway condition that is changed for, or potentially hazardous to, public traffic and workers.

The fluorescent orange sign colour indicates the temporary nature of the condition.

Signs should generally be placed sufficiently in advance of the condition to provide drivers with time to understand the information and respond appropriately. See [Section 6.6: Positioning of Temporary Traffic Control Devices](#) and [Sections 7 through 19](#).

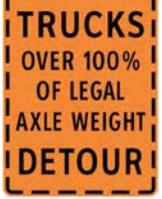
C-001 Series Traffic Control Person Ahead		
 <p>C-001-1</p>	<p>Sign sizes (mm)</p> <p>C-001-1 (750 x 750)</p> <p>C-001-1xx (1200 x 1200)</p>	<p>The TRAFFIC CONTROL PERSON AHEAD C-001-1 sign should be used in advance of any point at which a Traffic Control Person is stationed to control traffic through a work activity area.</p> <p>It is always used in conjunction with other construction and maintenance signs.</p>
 <p>C-001-2</p>	<p>C-001-2 (750 x 750)</p> <p>C-001-2xx (1200 x 1200)</p>	<p>The FLAGGER AHEAD C-001-2 sign may be used in advance of the C-001-1 sign in areas that require additional advance warning.</p> <p>C-001-1 and C-001-2 signs should be promptly removed or covered whenever a Traffic Control Person is not on the roadway.</p>

C-002 Series Crew Working - Maximum XX km/h		
 <p>C-002-1</p>	<p>Sign sizes (mm)</p> <p>C-002-1 (450 x 900)</p> <p>C-002-1x (600 x 1200)</p>	<ul style="list-style-type: none"> The SURVEY CREW WORKING – MAXIMUM XX km/h C-002-1 sign is used to establish a Temporary Speed Zone, typically when survey crews are working on the travelled portion of the roadway (road lanes and shoulders). <p>It may also be used as a supplement to an R-004 Construction Speed Limit to remind drivers of the reduced speed as they approach, or are within, the work area.</p>
 <p>C-002-1 OL</p>	<p>C-002-1 OL (175 x 280)</p> <p>C-002-1 OL-x (233 x 372)</p>	<p>See also the SURVEY CREW WORKING AHEAD C 003 sign below.</p> <ul style="list-style-type: none"> The CREW WORKING – MAXIMUM XX km/h C-002-2 sign is used to establish a Temporary Speed Zone, typically when crews are working on the travelled portion of the roadway (road lanes and shoulders). It may also be used as a supplement to an R-004 Construction Speed Limit to remind drivers of the reduced speed as they approach, or are within, the work area.
 <p>C-002-2</p>	<p>C-002-2 (450 x 900)</p> <p>C-002-2x (600 x 1200)</p>	<ul style="list-style-type: none"> The FLAGGER WORKING – MAXIMUM XX km/h C-002-3 sign is used to establish a Temporary Speed Zone, typically when Traffic Control People are directing traffic. It may also be used as a supplement to an R-004 Construction Speed Limit to remind drivers of the reduced speed as they approach, or are within, the work area.
 <p>C-002-2 OL</p>	<p>C-002-2-OL (175 x 280)</p> <p>C-002-2-OL-x (233 x 372)</p>	<p>Distance overlays C-002-1 OL and C-002-2 OL may be used to show alternative speed options.</p>
 <p>C-002-3</p>	<p>C-002-3 (450 x 900)</p> <p>C-002-3x (600 x 1200)</p>	

C-003 Survey Crew Working Ahead		
 <p>C-003</p>	<p>Sign sizes (mm)</p> <p>C-003 (750 x 750)</p> <p>C-003-x (900 x 900)</p>	<ul style="list-style-type: none"> • The SURVEY CREW WORKING C-003 sign should be used where survey work is in progress on or immediately adjacent to a travelled roadway that has not been closed to traffic. • The SURVEY CREW WORKING AHEAD C-003-A sign may also be used, in conjunction with the C-003 sign, to provide additional advanced warning, especially in locations with high speeds and/or high traffic volumes.
 <p>C-003-A</p>	<p>C-003-A (750 x 750)</p> <p>C-003-A-x (900 x 900)</p>	<ul style="list-style-type: none"> • When drones are used, the C-003 and C-003-A signs may be supplemented by the DRONE SURVEY C-003-Ta or DRONE C-003-Tb tabs to provide additional information for motorists.
 <p>C-003-Ta</p>	<p>C-003-Ta (600 x 300)</p> <p>C-003-Ta-x (750 x 400)</p>	<ul style="list-style-type: none"> • The DRONE IN USE C-003-2 sign may also be used to supplement the C-003 sign if the drone is within sight of motorists on the highway.
 <p>C-003-Tb</p>	<p>C-003-Tb (750 x 750)</p> <p>C-003-Tb-x (900 x 900)</p>	<ul style="list-style-type: none"> • All signs in this series may be used in conjunction with the SURVEY CREW – MAXIMUM XX km/h C-002-1 sign if the survey crew supervisor decides that conditions warrant the temporary speed zone.
 <p>C-003-2</p>	<p>C-003-2 (750 x 750)</p> <p>C-003-2-x (900 x 900)</p>	
C-004 Crew Working Ahead		
 <p>C-004</p>	<p>Sign sizes (mm)</p> <p>C-004 (750 x 750)</p> <p>C-004-xx (1200 x 1200)</p>	<p>The CREW WORKING AHEAD C-004 sign is the primary warning sign for short-duration work.</p> <p>It provides advance warning of crews and equipment carrying out a variety of tasks on or adjacent to a travelled roadway.</p>

C-005 Series Detour Markers		
 <p>C-005A</p>	<p>Sign sizes (mm)</p>	<p>The DETOUR C-005 signs are used to mark detour routes. For all work other than short-duration work, C-005 markers should be post-mounted.</p>
	<p>C-005A (600 x 450)</p>	<ul style="list-style-type: none"> C-005 markers with appropriate directional arrows should be used in advance of and beyond all decision points (and for confirmation where necessary) to assure drivers that they are following the detour.
	<p>C-005-5Ax (750 x 600)</p>	
 <p>C-005-B</p>	<p>C-005-B (600 x 400)</p>	<ul style="list-style-type: none"> Where the detour involves a numbered route, appropriate C-005 markers should be erected with the appropriately numbered route marker.
	<p>C-005-Bx (750 x 450)</p>	<ul style="list-style-type: none"> The DETOUR ROUTE C-005-B sign may be used as a supplemental confirmatory sign after a turn to inform motorists they are on the detour route
 <p>C-005-C</p>	<p>C-005-C (600 x 400)</p>	<ul style="list-style-type: none"> The END DETOUR C-005-C sign is used to mark the end of the detour and informs motorists they are back on the original roadway.
	<p>C-005-Cx (750 x 450)</p>	<ul style="list-style-type: none"> The STREET DETOUR custom C-005-D sign may be used as a supplement to detour signs within this series on local low-speed roadways or arterials. The street name utilized on these signs is the road where the closure occurs. It provides confirmatory information to motorists that they are following the correct detour, especially in locations with many alternative routes.
		<ul style="list-style-type: none"> The DETOUR LEFT/RIGHT C-005-LR1 signs are used in advance of a turn for the detour route. It tells motorists which direction to turn in order to continue following along the detour.
		
		
 <p>C-005-D</p>	<p>C-005-D (W.T.S. x 400)</p>	<p>The approach to the beginning of a detour will generally be indicated by the DETOUR AHEAD C-006 series signs.</p>
		<p>See Section 19.6: Roadway Closure with Detour (≤ 60 km/h) and Section 19.7: Roadway Closure with Detour (≥ 70 km/h) for how these signs may be used.</p>
	<p>C-005-LR1 (600 x 450)</p>	
 <p>C-005-LR1</p>	<p>C-005-LR1x (750 x 600)</p>	

continued →

C-005 Series Detour Markers (continued)		
 <p>C-005-LR2</p>	<p>Sign sizes (mm)</p> <p>C-005-LR2 (600 x 450)</p> <p>C-005-LR2x (750 x 600)</p>	<p>The DETOUR LEFT/RIGHT AHEAD C-005-LR2 signs may be used as a supplement to the DETOUR LEFT/RIGHT C-005-LR1 signs to provide additional information and better prepare drivers for the turn ahead to stay on the detour route.</p> <p>See Section 19.6: Roadway Closure with Detour (≤ 60 km/h) and Section 19.7: Roadway Closure with Detour (≥ 70 km/h) for how these signs may be used.</p>
C-006 Series Detour Ahead		
 <p>C-006-A</p>	<p>Sign sizes (mm)</p> <p>C-006-A (750 x 750)</p> <p>C-006-Axx (1200 x 1200)</p>	<p>The DETOUR AHEAD C-006-A sign is used to warn traffic of the beginning of a detour.</p> <p>If the departure is abrupt, which is often the case in an urban block system, it may be necessary to:</p> <ul style="list-style-type: none"> • substitute for DETOUR AHEAD C-006-LR signs, or • in higher speed/volume situations, use C-006-LR signs in advance of the detour, and a C-006-A signs further upstream.
 <p>C-006-LR</p>	<p>C-006-LR (750 x 750)</p> <p>C-006-LRxx (1200 x 1200)</p>	<p>If the bypass route is short and adjacent to a work activity area—i.e., within the highway right-of-way—it is better to use a ROADSIDE DIVERSION AHEAD C-052-L/R sign.</p> <p>They may also be used for turns on a detour route instead of DETOUR C-005-LR markers where special emphasis is required.</p>
 <p>C-006-4Tx</p>	<p>C-006-4X (900 x 1200)</p>	<p>For work zones which require overweight trucks to detour onto another route, the TRUCKS OVER 100% OF LEGAL AXLE WEIGHT DETOUR C-006-4X sign, in conjunction with the ARROW TAB C-006-4Tx should be used to direct heavy trucks onto the detour route.</p>
 <p>C-006-4X</p>	<p>C-006-4Tx (900 x 300)</p>	<p>Other custom signs for trucks may be developed for over height and over width purposes.</p>

C-007 Broken Pavement		
 <p>C-007</p>	<p>Sign sizes (mm)</p> <p>C-007 (750 x 750)</p> <p>C-007-x (900 x 900)</p>	<p>The BROKEN PAVEMENT C-007 sign should be used where sections of badly broken or potholed pavement exceed 20 metres in length.</p> <p>Where a speed reduction is deemed necessary because of the pavement condition, an ADVISORY SPEED C-022 tab may be posted with the C-007 sign.</p> <p>If the length of broken pavement is 2 kilometres or more, an ADVISORY DISTANCE C-024 distance tab may be included.</p> <p>TEMPORARY HAZARD C-090 markers should be used with C-007 signs to mark the actual locations of the irregularities.</p>
C-008-1 Paving Next X km – Please Obey Signs C-008-2 Seal Coating – Loose Gravel Next X km		
 <p>C-008-1</p>  <p>C-008-2</p>  <p>C-008-OL</p>	<p>Sign sizes (mm)</p> <p>C-008-1 (1200 x 900)</p> <p>C-008-1xx (2440 x 1220)</p> <p>C-008-2 (1200 x 900)</p> <p>C-008-2xx (2440 x 1220)</p> <p>C-008-OL (230 x 200)</p> <p>C-008-OLxx (350 x 230)</p>	<p>The PAVING NEXT X km – PLEASE OBEY SIGNS C-008-1 sign should be installed in advance of all paving projects. The C-008-1 specifies the distance in kilometres of the paving project.</p> <p>The SEAL COATING – LOOSE GRAVEL NEXT X km C-008-2 sign should be installed in advance of all seal coating projects. The C-008-2 specifies the distance in kilometres of the sealcoating project.</p> <p>Distance overlays C-008-OL are available for revising existing C-008-1 and C-008-2 signs that are in good condition.</p>

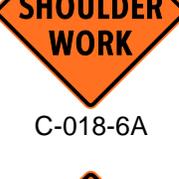
C-009 Milling in Progress – Rumble Strips		
 <p>C-009-1</p>  <p>C-009-2</p>	<p>Sign sizes (mm)</p> <p>C-009-1 (750 x 750)</p> <p>C-009-1x (900 x 900)</p> <p>C-009-2 (750 x 750)</p> <p>C-009-2x (900 x 900)</p>	<p>The MILLING IN PROGRESS SHOULDER RUMBLE STRIPS C-009-1 sign is used to warn motorists of equipment, workers and potentially uneven surfaces caused by milling for shoulder rumble strips.</p> <p>The MILLING IN PROGRESS CENTRE LINE RUMBLE STRIPS C-009-2 sign is used to warn motorists of equipment, workers and potentially uneven surfaces caused by milling for centre line rumble strips.</p> <p>ADVISORY DISTANCE C-024 tabs should be used with both signs in the C-009 series to inform drivers of the expected distance for this condition.</p>
C-010 Uneven Pavement on Left/Right		
 <p>C-010-LR</p>	<p>Sign sizes (mm)</p> <p>C-010-LR (750 x 750)</p> <p>C-010-LRxx (1200 x 1200)</p>	<p>The UNEVEN PAVEMENT ON LEFT/RIGHT C-010 sign warns of a difference in elevation between pavement lifts on adjacent travel lanes.</p> <p>(The LOW SHOULDER C-013 sign warns of a difference in elevation between the shoulder and the outer edge of a newly paved roadway.)</p> <p>On two-lane, two-way roadways, the uneven hazard (high or low) will generally be on the centreline, and C-010-L signs are used for both directions of travel in advance of the section (and as required for confirmation throughout).</p> <p>On multilane roadways, the uneven hazard will generally be on the lane line. In such cases, C-010-L signs are placed on the right shoulder and, where space is available, C-010-R signs are placed on the left or median shoulder.</p> <p>The UNEVEN PAVEMENT ENDS C-016 sign is be used to mark the end of an uneven section of pavement.</p>

C-011 Grooved Pavement		
C-011-T Median and Shoulders Tab		
 <p>C-011</p>  <p>C-011-T</p>	<p>Sign sizes (mm)</p> <p>C-011 (750 x 750)</p> <p>C-011-xx (1200 x 1200)</p> <p>C-011-T (600 x 300)</p> <p>C-011-Txx (900 x 450)</p>	<p>The GROOVED PAVEMENT C-011 sign should be used in advance of sections of milled pavement (and as required for confirmation throughout) which affects the handling of vehicles.</p> <p>The MEDIAN AND SHOULDERS C-011-T tab may be used with the C-011 sign only where the grooved pavement condition is found on the median and shoulders and not in the travel lane(s).</p>
C-012 Soft Shoulder		
 <p>C-012</p>	<p>Sign sizes (mm)</p> <p>C-012 (750 x 750)</p> <p>C-012-x (900 x 900)</p>	<p>The SOFT SHOULDER C-012 sign should be used in advance of a section of shoulder that is either newly laid and not compacted or so softened by weather or other conditions that it presents a hazard to vehicles pulling off the travelled roadway.</p> <p>If the soft shoulder condition is extensive, confirmatory C-012 signs may be required.</p>
C-013 Low Shoulder on Left/Right		
 <p>C-013-LR</p>	<p>Sign sizes (mm)</p> <p>C-013-LR (750 x 750)</p> <p>C-013-LRxx (1200 x 1200)</p>	<p>The LOW SHOULDER ON LEFT/RIGHT C-013 sign should be used on unfinished paving projects where the shoulders have not been brought up to the level of the new pavement and the drop-off is potentially hazardous.</p> <ul style="list-style-type: none"> • The C-013-R sign is erected on the right side of the roadway in advance of a low shoulder. • Where traffic is required to use the left side of a roadway with a low shoulder, a C-013-L sign is erected on the left shoulder.

C-014 Fresh Oil		
 <p>C-014</p>	<p>Sign sizes (mm)</p> <p>C-014 (750 x 750)</p> <p>C-014-x (900 x 900)</p>	<p>The FRESH OIL C-014 sign should be used to warn drivers of freshly sprayed liquid asphalt (prime or tack coat) on the road surface on paving, extensive machine patching, and seal coating projects. Asphalt can be slippery until it has cured, and the work may damage other vehicles.</p> <p>Even after the spray has cured, C-014 signs should be retained until the sprayed area has been covered with new pavement or a sand/chip seal coat.</p> <p>The C-014 sign is placed in advance of the sprayed area and repeated at intervals for confirmation throughout long sections.</p> <p>If a cured sprayed section is to remain exposed when work is not in progress, C-014 signs should be augmented with SLIPPERY WHEN WET C-141 signs to warn of potentially increased slipperiness in the event of rain.</p>

C-015 Loose Gravel		
 <p>C-015</p>	<p>Sign sizes (mm)</p> <p>C-015 (750 x 750)</p> <p>C-015-x (900 x 900)</p>	<p>The LOOSE GRAVEL C-015 sign should be placed in advance of a loose gravel condition that is potentially hazardous.</p> <p>It may also be required at intervals throughout the length of roadway on which the condition exists, especially in advance of curves.</p> <p>Examples of scenarios in which the C-015 sign may be required include:</p> <ul style="list-style-type: none"> • freshly-graded gravel roads • sections of new, unswept chip seal coat • areas where gravel has been deposited on the pavement edge by shouldering • construction areas with uncompacted gravel
C-016 Uneven Pavement Ends		
 <p>C-016</p>	<p>Sign sizes (mm)</p> <p>C-016 (600 x 600)</p> <p>C-016-x (900 x 900)</p>	<p>The UNEVEN PAVEMENT ENDS C-016 sign should be used to mark the end of an uneven section of pavement.</p> <p>It is typically used on paving jobs in conjunction with one of the following signs:</p> <ul style="list-style-type: none"> • C-007 Broken Pavement • C-010-LR Uneven Pavement on Left/Right • C-011 Grooved Pavement • C-013-LR Low Shoulder on Left/Right • C-017 Bump or Rough Roadway Ahead <p>Note: The positioning of C-016 and other signs requires frequent adjustment as paving progresses.</p>

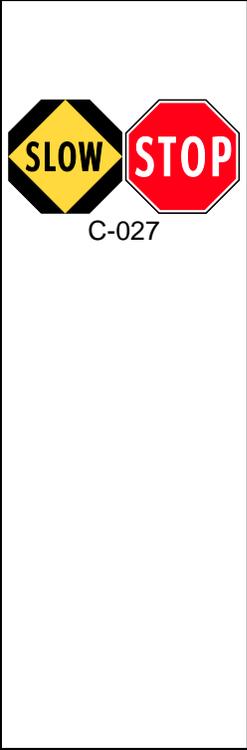
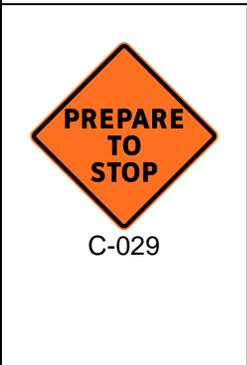
C-017 Bump, Rough Roadway, or Steel Plate			
 C-017-1	Sign sizes (mm) C-017-1 (750 x 750) C-017-1x (900 x 900) C-017-1xx (1200 x 1200)	The BUMP OR ROUGH ROADWAY C-017 sign should be used to warn of sharp changes in the road profile that are sufficiently abrupt to create a potentially hazardous condition, and in advance of temporary rumble strips. This sign should replace the TEMPORARY SLOW C-090 marker in advance of short potholed sections, frost heaves, fill settlements, etc. when the hazards are unlikely to be removed promptly.	
	 C-017-2A	C-017-2A (750 x 750) C-017-2Ax (900 x 900) C-017-2Axx (1200 x 1200)	The STEEL PLATE C-017-2b sign should be used to warn motorists of a steel plate on the road surface and to exercise caution when travelling over the steel plate as there may be an uneven surface. The STEEL PLATE AHEAD C-017-a sign may be used in conjunction with the STEEL PLATE C-017-2b sign to provide additional warning.
		 C-017-2B	C-017-2B (750 x 750) C-017-2Bx (900 x 900) C-017-2Bxx (1200 x 1200)
 C-017-3L	C-017-3L (750 x 750) C-017-3Lx (900 x 900) C-017-3Lxx (1200 x 1200)		
	 C-017-3R	C-017-3R (750 x 750) C-017-3Rx (900 x 900) C-017-3Rxx (1200 x 1200)	

C-018 Series Construction Ahead		
 <p>C-018-1A</p>	<p>Sign sizes (mm)</p> <p>C-018-1A (750 x 750)</p> <p>C-018-1Axx (1200 x 1200)</p>	<ul style="list-style-type: none"> • The CONSTRUCTION AHEAD C-018-1A sign should be erected in the advance warning area on long duration work, typically no further than one kilometre in advance of the work activity area.
 <p>C-018-2A</p>	<p>C-018-2A (750 x 750)</p> <p>C-018-2Axx (1200 x 1200)</p>	<ul style="list-style-type: none"> • The CONSTRUCTION AHEAD – 2 km C-018-2A sign may be used for long-duration work zones on roadways where the normal speed limit is 70 km/h or higher to extend the advance warning.
 <p>C-018-3A</p>	<p>C-018-3A (750 x 750)</p> <p>C-018-3Axx (1200 x 1200)</p>	<ul style="list-style-type: none"> • The ROAD WORK AHEAD C-018-3A sign or ROAD SURVEY AHEAD C-018-4A sign may be erected in advance warning areas for short-duration work instead of—or in addition to—the CREW WORKING AHEAD C-004 sign or SURVEY CREW WORKING AHEAD C-003 sign.
 <p>C-018-4A</p>	<p>C-018-4A (750 x 750)</p> <p>C-018-4Ax (900 x 900)</p>	<ul style="list-style-type: none"> • The SHOULDER WORK AHEAD C-018-6A sign and the SHOULDER WORK C-018-7 sign may be used in advance of short-duration work on a shoulder as a supplement to the C-004 sign or vehicle lights. For long-duration work on a shoulder, the SHOULDER WORK AHEAD C-018-6A sign may be used instead of the CONSTRUCTION AHEAD C-018-1A sign.
 <p>C-018-6A</p>	<p>C-018-6A (750 x 750)</p> <p>C-018-6Ax (900 x 900)</p> <p>C-018-6Axx (1200 x 1200)</p>	<ul style="list-style-type: none"> • For work in progress, the SHOULDER WORK C-018-7 sign may be positioned at the beginning of the shoulder taper in advance of the work.
 <p>C-018-7</p>	<p>C-018-7 (750 x 750)</p> <p>C-018-7x (900 x 900)</p> <p>C-018-7xx (1200 x 1200)</p>	<p style="text-align: right;"><i>continued →</i></p>

C-018 Series Construction Ahead (continued)		
 <p>C-018-8L</p>	<p>Sign sizes (mm)</p> <p>C-018-8L (750 x 750)</p> <p>C-018-8Lx (900 x 900)</p> <p>C-018-8Lxx (1200 x 1200)</p>	<ul style="list-style-type: none"> The CONSTRUCTION AHEAD C-018-8L and C-018-8R signs may be used when the construction zone is at or near an intersection. <p>If there is a need to place the CREW WORKING C-004 sign or the CONSTRUCTION AHEAD C-018-1A sign on roadways other than the one where the work area is, especially in urban conditions, the CONSTRUCTION AHEAD C-018-8L and C-018-8R signs may be used in place of the CREW WORKING C-004 sign or the CONSTRUCTION AHEAD C-018-1A sign.</p>
 <p>C-018-8R</p>	<p>C-018-8R (750 x 750)</p> <p>C-018-8Rx (900 x 900)</p> <p>C-018-8Rxx (1200 x 1200)</p>	<p>If used, CONSTRUCTION AHEAD C-018-8L and C-018-8R signs should be placed in advance of the intersection to inform drivers of where the work area is, and whether or not it will be on their desired route. These signs should be placed in a location upstream of the adjacent intersection so as not to confuse drivers which street the construction is on.</p>
 <p>C-018-8A</p>	<p>C-018-8A (750 x 750)</p> <p>C-018-8Ax (900 x 900)</p>	<ul style="list-style-type: none"> The CENTRELINE WORK AHEAD C-018-8A sign and the CENTRELINE WORK C-018-9 sign may be used in advance of centreline short-duration work as a supplement. <p>For long-duration work on the centreline, the CENTRELINE WORK AHEAD C-018-8A sign may be used instead of the CONSTRUCTION AHEAD C-018-1A sign.</p>
 <p>C-018-9</p>	<p>C-018-9 (750 x 750)</p> <p>C-018-9x (900 x 900)</p>	

C-019 Series Motorcycle Rough Surface		
 <p>C-019</p>  <p>C-019-T</p>	<p>Sign sizes (mm)</p> <p>C-019 (750 x 750)</p> <p>C-019-x (900 x 900)</p> <p>C-019-T (600 x 300)</p> <p>C-019-Tx (750 x 400)</p>	<p>The MOTORCYCLE ROUGH SURFACE C-019 sign should be used when construction activity has created a rough or irregular riding surface (e.g., a temporary gravel surface, scarified or milled asphalt, etc.).</p> <p>Whenever a temporary gravel surface is present, the GRAVEL SURFACE C-019-T tab should be used in conjunction with the C-019 sign.</p>
C-020 Series One Way Arrow		
 <p>C-020-1LR</p>  <p>C-020-2L</p>  <p>C-020-2R</p>	<p>Sign sizes (mm)</p> <p>C-020-1LR (900 x 300)</p> <p>C-020-1LRx (1200 x 400)</p> <p>C-020-2L (900 x 300)</p> <p>C-020-2Lx (1200 x 400)</p> <p>C-020-2R (900 x 300)</p> <p>C-020-2Rx (1200 x 400)</p>	<p>The ONE WAY ARROW C-020 series signs indicates to motorists that a road is restricted to travel in only one direction.</p> <p>The text "ONE WAY" may be added within the arrow, as shown in the C-020-2L and C-020-2R signs. This is the Ministry's preferred option as it is in wide use throughout North America and is well recognized by road users.</p>

C-022 Advisory Speed Tab		
 <p>C-022</p>	<p>Sign sizes (mm)</p> <p>C-022 (600 x 600)</p> <p>C-022-x (750 x 750)</p> <p>C-022-xx (900 x 900)</p>	<p>The ADVISORY SPEED C-022 tab may be used with construction signs to indicate the maximum advisory speed around a curve or through a hazard.</p> <p>This tab should never be used as a standalone device.</p> <p>The C-022 tab should be mounted below the sign it supplements, with the bottom edge of the tab at least 1.2 metres above the travelled roadway edge.</p> <p>Except in emergencies, C-022 tabs should not be erected until a suitable speed has been determined by applying an accepted engineering analysis.</p> <p>The C-022 tab is only used when traffic must slow at least 20 km/h below the normal speed limit.</p>
C-024 Advisory Distance Tab		
 <p>C-024</p>	<p>Sign sizes (mm)</p> <p>C-024 (600 x 600)</p> <p>C-024-x (750 x 750)</p> <p>C-024-xx (900 x 900)</p>	<p>The ADVISORY DISTANCE C-024 tab may be used below construction signs when the distance over which the warning is in effect is 2 kilometres or more.</p> <p>The C-024 tab should be mounted below the sign it supplements, with the bottom edge of the tab at least 1.2 metres above the travelled roadway edge.</p>

C-027 Traffic Control Paddle		
 <p>C-027</p>	<p>Sign sizes (mm)</p> <p>C-027 (400 x 400)</p>	<p>The TRAFFIC CONTROL PADDLE C-027 is used by Traffic Control Persons to control traffic.</p> <p>See Section 5: Traffic Control Persons and Part 18 of WorkSafeBC's Occupational Health and Safety Regulations for approved methods of using the paddle and associated devices.</p> <p>When it is to be used for an extended period, the handle can be extended by fitting a dowel approximately 2.5 cm in diameter and 1.3 metres long into the short handle, thereby allowing the Traffic Control Person to display the paddle comfortably at the recommended height.</p> <p>If only the message on one side of the paddle is required, the message on the other side is covered or shielded to avoid showing an inappropriate message to drivers approaching from the opposite direction.</p> <p>LED lights matching the colour of the sign face may be used around the perimeter of the sign. These lights should be steady burn but may flash at 60 Hz.</p>
C-028 Proceed only when Directed		
 <p>C-028</p>	<p>Sign sizes (mm)</p> <p>C-028 (600 x 450)</p> <p>C-028-xx (900 x 600)</p>	<p>The PROCEED ONLY WHEN DIRECTED C-028 sign should be used when a partially controlled work zone or a pilot car system is in place.</p> <p>The C-028 sign should accompany one of these signs:</p> <ul style="list-style-type: none"> • C-001-1 Traffic Control Person Ahead • C-029 Prepare To Stop • C-049 Follow Pilot Car
C-029 Prepare to Stop		
 <p>C-029</p>	<p>Sign sizes (mm)</p> <p>C-029 (750 x 750)</p> <p>C-029-xx (1200 x 1200)</p>	<p>The PREPARE TO STOP C-029 sign should be used in advance of these signs to give additional notice:</p> <ul style="list-style-type: none"> • C-001-1 Traffic Control Person Ahead • C-111 Stop Ahead • C-112 Signal Ahead • R-056-1 Yield to Oncoming Traffic <p>The C-029 sign must never be used alone to warn of a hazard.</p>

C-030 Series Roadway/Lane Closed		
 C-030-1A	Sign sizes (mm) C-030-1A (750 x 750) C-030-1Axx (1200 x 1200)	<ul style="list-style-type: none"> The CENTRE LANE CLOSED AHEAD C-030-1A and CENTRE LANE CLOSED C-030-2 signs are used in advance of a centre lane closure where approaching traffic is directed to the right or left of a work zone in the centre lane.
 C-030-2	C-030-2 (750 x 750) C-030-2xx (1200 x 1200)	<p>The upstream C-030-1A sign may also display a bottom-mounted C-130-T distance tab indicating the distance to the beginning of the lane closure taper.</p> <p>If space is available in the median, secondary C-030-1A and C-030-2 signs should be erected in the median across from the shoulder signage.</p>
 C-030-3A	C-030-3A (750 x 750) C-030-3Axx (1200 x 1200)	<ul style="list-style-type: none"> The LEFT LANE CLOSED C-030-3A sign and the RIGHT LANE CLOSED C-030-4A sign may be used in addition to the LANE CLOSURE C-130-L/R signs to provide additional advance notice of a lane closure.
 C-030-4A	C-030-4A (750 x 750) C-030-4Axx (1200 x 1200)	<p>The C-030-3A and C-030-4A signs may also be used to indicate a lane closure in complex lane arrangements where the graphical C-130-L/R signs may not be sufficiently clear.</p>
 C-030-5AL	C-030-5AL (750 x 750) C-030-5ALxx (1200 x 1200)	<ul style="list-style-type: none"> The LEFT/RIGHT TWO LANES CLOSED C-030-5A sign may be used in advance of, and in addition to, C-130-L/R signs to inform drivers that there are two lane closures ahead.
 C-030-5AR	C-030-5AR (750 x 750) C-030-5ARxx (1200 x 1200)	<p>The C-030-5A sign provides drivers with advance warning that two lanes are closed ahead. Lane closures should be established one at a time with adequate tangent length between lane closure tapers.</p>

continued →

C-030 Series Roadway/Lane Closed (continued)		
 <p>C-030-6A</p>	<p>Sign sizes (mm)</p> <p>C-030-6A (750 x 750)</p> <p>C-030-6Axx (1200 x 1200)</p>	<ul style="list-style-type: none"> The ROAD CLOSED C-030-6A sign and ONE LANE ROAD C-030-7A sign provide advance notice of a complete or partial road closure ahead. <p>The C-030-7A sign is applicable only to a two-lane, two-way roadway. It is typically followed by a single lane alternating traffic setup or a “yield to oncoming traffic” situation.</p> <p>The C-030-6A and the C-030-7A should typically be positioned following the CREW WORKING AHEAD C-004 sign or the CONSTRUCTION AHEAD C-018-1A sign.</p> <ul style="list-style-type: none"> The SINGLE LANE TRAFFIC C-030-8 sign should be used in advance of work activity areas on two-lane, two-way roadways where the usable roadway width has been reduced, and where traffic in both directions is therefore restricted to the alternating use of a single lane.
 <p>C-030-7A</p>	<p>C-030-7A (750 x 750)</p> <p>C-030-7Axx (1200 x 1200)</p>	
 <p>C-030-8</p>	<p>C-030-8 (750 x 750)</p> <p>C-030-8xx (1200 x 1200)</p>	<p><i>continued →</i></p>

C-030 Series Roadway/Lane Closed (continued)		
 <p>C-030-14</p>	<p>Sign sizes (mm)</p> <p>C-030-14 (750 x 750)</p> <p>C-030-14x (900 x 900)</p> <p>C-030-14xx (1200 x 1200)</p>	<ul style="list-style-type: none"> The LEFT TWO LANES CLOSED C-030-14 sign may be used in advance of a closure of the left two lanes where there are three or more lanes per direction. <p>It should typically be applied in advance of the first LANE CLOSED AHEAD C-130 sign with a bottom-mounted tab indicating the distance to the beginning of the first lane closure taper.</p> <p>This sign provides drivers with advance warning that two lanes are closed ahead. Lane closures should be established one at a time with adequate tangent length between lane closure tapers.</p>
 <p>C-030-15</p>	<p>C-030-15 (750 x 750)</p> <p>C-030-15x (900 x 900)</p> <p>C-030-15xx (1200 x 1200)</p>	<ul style="list-style-type: none"> The RIGHT TWO LANES CLOSED C-030-15 sign may be used in advance of a closure of the right two lanes where there are three or more lanes per direction. <p>It should typically be applied in advance of the first LANE CLOSED AHEAD C-130 sign with a bottom-mounted tab indicating the distance to the beginning of the first lane closure taper.</p> <p>This sign provides drivers with advance warning that two lanes are closed ahead. Lane closures should be established one at a time with adequate tangent length between lane closure tapers.</p> <p>Where adequate space is available on the left or median side, the signing should be repeated on the median across from the right shoulder signage.</p>

C-031 Oncoming Traffic		
 <p>C-031</p>	<p>Sign sizes (mm)</p> <p>C-031 (750 x 750)</p> <p>C-031-x (900 x 900)</p>	<p>The ONCOMING TRAFFIC C-031 sign should be used where the normal traffic pattern has been changed such that there may be unexpected oncoming traffic.</p> <p>For example, it may be used for a median crossover, or when traffic is directed to travel in an oncoming lane.</p>
C-032 Reduce Speed		
 <p>C-032</p>	<p>Sign sizes (mm)</p> <p>C-032 (750 x 750)</p> <p>C-032-xx (1200 x 1200)</p>	<p>The REDUCE SPEED C-032 sign may be used in conjunction with LANE CLOSED C-030 and C-130 signs in the advance warning area on multilane highways where the speed limit is 70 km/h or higher.</p> <p>It is not required where a Construction Speed Zone has been established, but can be useful in slowing traffic without imposing a lower legal speed limit.</p>
C-033 and C-034 Blasting Zone		
 <p>C-033</p>  <p>C-034</p>	<p>Sign sizes (mm)</p> <p>C-033 (600 x 750)</p> <p>C-033-x (750 x 900)</p> <p>C-034 (600 x 600)</p> <p>C-034-x (750 x 750)</p>	<p>The BLASTING ZONE C-033 and C-034 signs should be used on all occasions when blasting is carried out in the vicinity of a public roadway.</p> <p>The signs should be positioned as follows:</p> <ul style="list-style-type: none"> • The C-033 sign is placed at least 500 metres in advance of the blasting zone. • The C-034 sign is placed 300 metres beyond the blasting area. <p>The C-033 and C-034 signs should be removed or covered immediately after a set of charges has been exploded, and should not be displayed again until just before the commencement of further drill-hole loading.</p>

C-035 Construction Project

CONSTRUCTION PROJECT C-035 signs must be erected for capital rehabilitation and expansion projects with an approximate value of \$500,000 or greater. They may also be erected for a smaller project if its construction duration is expected to be longer than two months and the project is located in a high-traffic area.

The Project Manager is responsible for:

- Ordering the C-035 signs from a sign manufacturer
- Providing the appropriate project information to be applied to the signs
- Arranging delivery to the Prime Contractor.

For federal C-035 signs, the project manager must contact Government Communications and Public Engagement (GCPE) who will liaise with the federal government to provide the bilingual information required for project signs.

C-035 signs should be erected prior to the commencement of a project.

For provincial projects, the sign information must specify:

- Project Name
- Project Description
- Expected Completion Date (by season) - e.g., Complete: Summer 2020
- Full Project Value - e.g., Value \$8.8 Million

For federal-provincial partnership projects, the sign information must specify (in both English and French):

- Project Name
- Full Project Value - e.g., \$0.5 M
- Expected Completion Date (by season) - e.g., Complete: Fall 2018

The C-035 sign fabrication records for manufacturing purposes are available at:

<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/traffic-engineering-safety/traffic-signs-markings>

The C-086-1 or C-086-2 “End of Project” sign should be erected just beyond the project’s “limit of construction”.

At the completion of the project, the C-035-CMP “Completed” tab is to be applied to the C-035 sign. The sign and tab should remain installed for no longer than six months after completion of the project at which time, weather dependent, the signs and tabs should be removed from the right-of-way. The “Completed” tab may be stored and re-used if it remains in good condition.

Policy information and sign design for the C-035 sign are updated frequently so Project Managers should check the Ministry’s current technical circulars for updated information:

<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/technical-circulars>

C-036 Slow Moving Vehicle		
 <p style="text-align: center;">C-036</p>	<p>Sign sizes (mm)</p> <p>C-036 (350 x 350 x 350)</p>	<p>In accordance with Sections 7B.01 to 7B.04 of the Motor Vehicle Act Regulation, the SLOW MOVING VEHICLE C-036 marker is displayed temporarily on the rear of any vehicle or mobile equipment employed in a work area and required to travel on a roadway at a speed of 40 km/h or less.</p> <p>This requirement applies to any vehicle involved in continuously slow-moving road work.</p> <p>When the vehicle is travelling at normal highway speeds, the C-036 marker should be covered or removed.</p> <p>The C-036 marker should also be displayed on the rear of mobile equipment units involved in road work which is incapable of moving consistently at speeds above 40 km/h. It may be displayed permanently on these units.</p> <p>The SLOW MOVING VEHICLE C-036 marker must be mounted in the orientation shown, as close as possible to the rear/centre of the unit, and 90 to 150 cm above ground level.</p>
C-037 Series Wet Paint and Wet Paint – Keep Off		
 <p style="text-align: center;">C-037-1</p>  <p style="text-align: center;">C-037-2</p>	<p>Sign sizes (mm)</p> <p>C-037-1 (600 x 200)</p> <p>C-037-2 (600 x 300)</p>	<p>The WET PAINT C-037-1 and WET PAINT – KEEP OFF C-037-2 signs may be used in areas where road markings have been applied to advise that wet paint has been applied to the roadway and drivers should refrain from driving on the freshly-painted lines.</p>

C-038 Truck Stopped on Road Next 2 km		
 <p>C-038</p>	<p>Sign sizes (mm)</p> <p>C-038 (750 x 750)</p> <p>C-038-xx (1200 x 1200)</p>	<p>The TRUCK STOPPED ON ROAD NEXT 2 km C-038 sign should be used in advance of intermittently-moving work such as crack sealing, temporary patching, Benkleman beam testing, retroreflective road stud installation, etc.</p> <p>The maximum distance between two opposing C-038 signs should not exceed 2 kilometres.</p>
C-039 Caution – This Truck Stops Frequently		
 <p>C-039</p>	<p>Sign sizes (mm)</p> <p>C-039 (750 x 300)</p> <p>C-039-x (1525 x 600)</p>	<p>The CAUTION – THIS TRUCK STOPS FREQUENTLY C-039 sign is a special-purpose sign that should be displayed on the rear of vehicles involved with intermittently-moving work on an open travel lane.</p> <p>It should be removed or covered when work is not in progress.</p>
C-040D Prepare to Stop		
 <p>C-040D</p>	<p>Sign sizes (mm)</p> <p>C-040D (2440 x 915)</p>	<p>The PREPARE TO STOP C-040D sign is a double-sided plywood sign that may be mounted atop Benkleman beam testing vehicles and other vehicles involved in intermittently-moving work in a travel lane on a two-lane, two-way roadway.</p> <p>It should be lowered or removed when the vehicle is not blocking the travel lane.</p> <p>To address difficulties mounting the C-040D sign on some types of vehicles, a squarer version may be used if the face area and letter height are not compromised.</p>

C-041-xx Road Marking		
 <p>C-041-xx</p>	<p>Sign sizes (mm)</p> <p>C-041-xx (1200 x 1200)</p>	<p>The ROAD MARKING C-041 sign is a double-sided sign.</p> <p>The ROAD MARKING IN PROGRESS side of the C-041 sign should face approaching traffic in advance of conventional pavement marking operations on two-lane, two-way rural roads (see Section 14.8: Conventional Long-Line Marking – Multilane Roadway and Section 14.9: Left-Turn Arrow Marking).</p> <p>The WET PAINT side of the C-041 sign should be displayed towards traffic approaching freshly painted lines that have been marked with traffic cones.</p> <p>The maximum distance shown on the sign should be 10 kilometres.</p>
C-042 Series Pass This Side / Traffic Control Person Operating		
 <p>C-042-LR</p>  <p>C-042-SLR</p>	<p>Sign sizes (mm)</p> <p>C-042-LR (900 x 600)</p> <p>C-042-SLR (900 x 600)</p>	<p>The PASS THIS SIDE C-042-LR sign should be displayed on the rear of paint trucks and shadow vehicles, or as required on other vehicles involved in a pavement-marking operation where a flashing arrow board (FAB) in arrow mode is unavailable or not used.</p> <p>It is also available with a TRAFFIC CONTROL PERSON OPERATING C-042-SLR sign displayed on the reverse side of the C-42-LR sign.</p> <p>The C-042-SLR sign is to be displayed on the rear of the paint truck when a Traffic Control Person is controlling traffic from the back of that truck.</p>

C-043 Caution – Paint Spray Truck Ahead		
 <p>C-043</p>	<p>Sign sizes (mm)</p> <p>C-043 (1200 x 900)</p>	<p>The CAUTION – PAINT SPRAY TRUCK AHEAD C-043 sign should be displayed on the front of an escort vehicle that is preceding a working paint truck.</p> <p>The escort vehicle may straddle the line to be painted, thereby forcing opposing traffic away from the paint truck and minimizing collision risk and overspray problems.</p>
C-044-xx Slow Vehicle Next X km		
 <p>C-044-xx</p>	<p>Sign sizes (mm)</p> <p>C-044-xx (1200 x 1200)</p>	<p>The SLOW VEHICLE NEXT X km C-044-xx sign should be used in advance of continuously slow-moving work—such as hydro-seeding, flushing, sweeping, etc.—where a travel lane is or may be obstructed.</p> <p>The maximum distance between two opposing C-044-xx signs should not exceed 8 kilometres.</p>
C-045 Slow Vehicle(s) Ahead		
 <p>C-045-1A</p>  <p>C-045-2A</p>	<p>Sign sizes (mm)</p> <p>C-045-1A (750 x 750)</p> <p>C-045-1Axx (1200 x 1200)</p> <p>C-045-2A (750 x 750)</p> <p>C-045-2Axx (1200 x 1200)</p>	<p>When a shadow vehicle on the shoulder follows a work vehicle involved in continuously slow-moving work, the SLOW VEHICLE(S) AHEAD C-045 sign or another appropriate sign should be displayed prominently on the rear of the shadow vehicle. Examples of other signs are:</p> <ul style="list-style-type: none"> • C-072 Grader Working • C-074 Mower Working • C-076 Sweeper Working <p>The SLOW VEHICLES AHEAD C-045-2A sign should be displayed downstream of the initial ROAD MARKING C-041 sign for two-lane, two-way operations.</p> <p>Confirmatory ROAD MARKING C-041 and C-045-2A signs should also be displayed alternately at intervals throughout a road-marking work zone.</p>

C-046 No Road Lines		
 <p>C-046</p>	<p>Sign sizes (mm)</p> <p>C-046 (750 x 750)</p> <p>C-046-x (900 x 900)</p>	<p>The NO ROAD LINES C-046 sign should be used if a roadway that would normally have pavement markings has none.</p> <p>If there are temporary markings in place, the TEMPORARY ROAD LINES/PAVEMENT MARKINGS C-047 sign should be used instead.</p> <p>These scenarios typically occur in work zones that involve paving, seal coating, milling, centreline crack sealing, etc.</p> <p>If the section without permanent pavement markings is more than 2 kilometres long, an ADVISORY DISTANCE C-024 tab may be mounted below the C-046 or C-047 sign.</p>
C-047 Series Temporary Road Lines/Pavement Markings		
 <p>C-047-1</p>  <p>C-047-2</p>	<p>Sign sizes (mm)</p> <p>C-047-1 (750 x 750)</p> <p>C-047-1x (900 x 900)</p> <p>C-047-2 (750 x 750)</p> <p>C-047-2x (900 x 900)</p>	<p>The TEMPORARY ROAD LINES C-047-1 sign should be used where temporary markings are used to replace longitudinal lines.</p> <p>The TEMPORARY PAVEMENT MARKINGS C-047-2 sign may be more appropriate at intersections and at other complex locations where the temporary markings represent more than just longitudinal lines.</p>

C-048-1-DS Pilot Car / Pilot Car – Do Not Pass		
 <p>C-048-1-DS</p>	<p>Sign sizes (mm)</p> <p>C-048-1-DS (1200 x 900)</p>	<p>The PILOT CAR / PILOT CAR – DO NOT PASS C-048-1-DS sign is a double-sided sign.</p> <p>It should be mounted atop the pilot vehicle, with the PILOT CAR message facing forward and the PILOT CAR – DO NOT PASS message facing backward.</p> <p>The C-048-1-DS sign must be removed or folded down whenever the vehicle is not piloting traffic.</p>
C-048-2 Pilot Car		
 <p>C-048-2</p>	<p>Sign sizes (mm)</p> <p>C-048-2 (1830 x 305)</p>	<p>The PILOT CAR C-048-2 sign should be mounted above a pilot vehicle that is piloting vehicles through construction zones.</p> <p>This sign may be used instead of the PILOT CAR / PILOT CAR – DO NOT PASS C-048-1-DS sign, and used in one of two ways:</p> <ul style="list-style-type: none"> • If it is to be used as a double-sided sign, the sign should be mounted atop of the pilot vehicle with the message displayed so that it is clear and visible from both the front and the rear. • If it is to be used as a back-lit sign, the sign material must allow light to pass through it so that it can be easily read in low-light and night applications. <p>The sign should be removed or folded down whenever the vehicle is not piloting traffic.</p>
C-049 Follow Pilot Car		
 <p>C-049</p>	<p>Sign sizes (mm)</p> <p>C-049 (750 x 750)</p> <p>C-049-x (900 x 900)</p>	<p>The FOLLOW PILOT CAR C-049 sign should be placed in advance of work where traffic is piloted through a work activity area.</p> <p>It is also used intermittently through the work area as a reminder and warning to drivers who may be unable to see the pilot car because they are in a long platoon of vehicles.</p>

C-050 Workers Below		
 <p>C-050-1</p>  <p>C-050-2</p>	<p>Sign sizes (mm)</p> <p>C-050-1 (600 x 600)</p> <p>C-050-1x (900 x 900)</p> <p>C-050-2 (750 x 750)*</p> <p>C-050-2x (900 x 900)*</p>	<p>The WORKERS BELOW C-050-1 and C-050-2 signs should be used to indicate that workers are present below the main travelling surface.</p> <p>These signs may be used for bridge or overpass/underpass applications, and in other situations in which workers are below the highway elevation and not visible to passing motorists.</p> <p>Either version of the sign may be used to indicate workers below. Typically, the C-050-2 sign is used as a standalone sign and the C-050-1 sign is used as a tab below another sign.</p>
C-051 Bridge Repair		
 <p>C-051</p>	<p>Sign sizes (mm)</p> <p>C-051 (750 x 750)</p> <p>C-051-x (900 x 900)</p>	<p>The BRIDGE REPAIR C-051 sign may be used instead of the CREW WORKING AHEAD C-004 sign and the CONSTRUCTION AHEAD C-018 sign.</p> <p>It may also be used in advance of bridge repair projects when the structure is still open to traffic on a restricted basis.</p>
C-052 Roadside Diversion Ahead		
 <p>C-052-L</p>  <p>C-052-R</p>	<p>Sign sizes (mm)</p> <p>C-052-L (750 x 750)</p> <p>C-052-Lxx (1200 x 1200)</p> <p>C-052-R (750 x 750)</p> <p>C-052-Rxx (1200 x 1200)</p>	<p>A roadside diversion is a “mini-detour”—usually adjacent to the normal route—by which traffic is diverted around a short work activity area. The transition away from and back to the normal route should not be abrupt.</p> <p>The ROAD SIDE DIVERSION AHEAD C-052-L/R sign should be used in advance of the diversion to indicate the path for drivers to follow. Diversions can involve both lanes of a two-lane, two-way roadway or a one- or two-lane section on a multilane highway.</p> <p>In the latter case, if the multilane highway is divided and space is available for a sign in the median, C-052 signs should be placed on both sides of the roadway approaching the diversion.</p>

C-053 Lane Closure Arrow		
 <p>C-053</p>	<p>Sign sizes (mm)</p> <p>C-053 (750 x 750)</p> <p>C-053-xx (1200 x 1200)</p>	<p>The LANE CLOSURE ARROW C-053 sign may replace a flashing arrow board to indicate the closure of a lane on a low-speed roadway. The C-053 sign are also be used for lane shifts on multi-lane roadway.</p> <p>It is positioned just inside the closed-off area at the beginning of the lane closure taper, and should be mounted high enough above the taper devices to be seen clearly by approaching drivers.</p> <p>The sign is oriented with the arrow pointing 45 degrees above horizontal, in the direction of the shift.</p> <p>For a short-duration work activity area in the centre of a two-lane, two-way roadway where traffic moving in both directions is required to pass the site on the right, and flashing arrow boards (FABs) are not required, a C-053 sign may be provided for one or both directions if the intended paths for drivers are not self-evident.</p>
C-057 Avalanche Control		
 <p>C-057</p>	<p>Sign sizes (mm)</p> <p>C-057 (750 x 750)</p> <p>C-057-x (900 x 900)</p>	<p>The AVALANCHE CONTROL C-057 sign should be used in advance of road closures for avalanches and avalanche control works.</p> <p>All signs relating to avalanche closures must be removed or covered when not required.</p>

C-058 Series Emergency Scene			
 C-058-1A	Sign sizes (mm) C-058-1A (750 x 750) C-058-1Ax (900 x 900) C-058-1Axx (1200 x 1200)	Emergency Scene C-058 series signs may be used in place of CREW WORKING AHEAD C-004 or CONSTRUCTION AHEAD C-018-1A signs when emergency personnel or first responders are responding to an incident. <ul style="list-style-type: none"> The ACCIDENT SCENE AHEAD C-058-1A sign may be used for motor vehicle incidents and recovery operations that could affect the normal movement of traffic. The C-058-1A sign may also be used by emergency services personnel. This is the sign most frequently used by Ministry maintenance contractors. The ACCIDENT SCENE C-058-1B sign may be used in conjunction with the ACCIDENT SCENE AHEAD C-058-1A sign to provide additional warning for motor vehicle incidents and recovery operations. This is the sign most frequently used by Ministry maintenance contractors. <ul style="list-style-type: none"> The EMERGENCY SCENE AHEAD C-058-2A sign may be used when there are first responders at an emergency scene, such as if there is a collision, fire, or vehicle breakdown. This is the sign most frequently used by police, fire and ambulance. The EMERGENCY SCENE C-058-2B sign may be used in conjunction with the EMERGENCY SCENE AHEAD C-058-2A sign to provide additional warning of the emergency scene ahead and to expect first responders. This is the sign most frequently used by police, fire and ambulance.	
	 C-058-1B		C-058-1B (750 x 750) C-058-1Bx (900 x 900) C-058-1Bxx (1200 x 1200)
			 C-058-2A
 C-058-2B	C-058-2B (750 x 750) C-058-2Bx (900 x 900) C-058-2Bxx (1200 x 1200)	Signs in the C-058 series may be orange or fluorescent pink. See Section 19.8 Emergency Response for how these signs should be used. Figure 19.8 Emergency Response shows a recommended setup when responding to emergency situations. It uses ACCIDENT SCENE AHEAD C-058-1A and ACCIDENT SCENE C-058-1B signs, which represent the most commonly used signs for emergency situations. Any of the other signs in this series may be used as alternatives to better represent the situation.	

continued →

C-058 Series Emergency Scene (continued)		
 <p>C-058-3A</p>	<p>Sign sizes (mm)</p> <p>C-058-3A (750 x 750)</p> <p>C-058-3Ax (900 x 900)</p> <p>C-058-3Axx (1200 x 1200)</p>	<ul style="list-style-type: none"> The EMERGENCY INCIDENT AHEAD C-058-3A sign may be used when there are first responders at an emergency incident. This is the sign most frequently used by police or HAZMAT responders. <p>The EMERGENCY INCIDENT C-058-3B sign may be used in conjunction with the EMERGENCY INCIDENT AHEAD C-058-3A sign to provide additional warning of the emergency incident ahead. This is the sign most frequently used by police or HAZMAT responders.</p>
 <p>C-058-3B</p>	<p>C-058-3B (750 x 750)</p> <p>C-058-3Bx (900 x 900)</p> <p>C-058-3Bxx (1200 x 1200)</p>	<ul style="list-style-type: none"> The POLICE INCIDENT AHEAD C-058-4A sign may be used when there are peace officers at a police incident. This is the sign most frequently used by police. <p>The POLICE INCIDENT C-058-4B sign may be used in conjunction with the POLICE INCIDENT AHEAD C-058-4A sign to provide additional warning of the police incident ahead. This is the sign most frequently used by police.</p>
 <p>C-058-4A</p>	<p>C-058-4A (750 x 750)</p> <p>C-058-4Ax (900 x 900)</p> <p>C-058-4Axx (1200 x 1200)</p>	<p>Signs in the C-058 series may be orange or fluorescent pink.</p> <p>See Section 19.8 Emergency Response for how these signs should be used.</p> <p>Figure 19.8 Emergency Response shows a recommended setup when responding to emergency situations. It uses ACCIDENT SCENE AHEAD C-058-1A and ACCIDENT SCENE C-058-1B signs, which represent the most commonly used signs for emergency situations. Any of the other signs in this series may be used as alternatives to better represent the situation.</p>
 <p>C-058-4B</p>	<p>C-058-4B (750 x 750)</p> <p>C-058-4Bx (900 x 900)</p> <p>C-058-4Bxx (1200 x 1200)</p>	

C-059 Road Flooded / Washout		
 <p>C-059-1</p>  <p>C-059-2</p>	<p>Sign sizes (mm)</p> <p>C-059-1 (750 x 750)</p> <p>C-059-1x (900 x 900)</p> <p>C-059-2 (750 x 750)</p> <p>C-059-2x (900 x 900)</p>	<p>The ROAD FLOODED C-059-1 sign should be used where water extends into the travelled roadway.</p> <p>The WASHOUT C-059-2 sign should be used where part of the shoulder or part of the roadway has washed out. There may still be sufficient width for two vehicles to pass safely at a reduced speed. Where the washout has encroached far enough to require the closure of a lane, additional traffic control will be required.</p>
C-061 Closed		
 <p>C-061</p>	<p>Sign sizes (mm)</p> <p>C-061 (750 x 300)</p> <p>C-061-x (900 x 350)</p> <p>C-061-xx (1200 x 450)</p>	<p>The CLOSED C-061 tab may be installed below a runaway or exit guide sign for a runaway lane or exit ramp that is closed and unavailable for use.</p> <p>See C-062 below if additional signage is needed for advance locations leading to runaway lanes and exit ramps.</p>

C-062 Exit Closed		
 <p>C-062</p>	<p>Sign sizes (mm)</p> <p>C-062 (1220 x 300)</p> <p>C-062-x (1444 x 350)</p> <p>C-062-xx (1905 x 450)</p>	<p>The EXIT CLOSED C-062 banner may be used on advance signing for a runaway lane or exit ramp that is closed and unavailable for use.</p> <p>The banner may be overlaid across the advance signing, typically at a 45-degree angle, to indicate the closure.</p>
C-063 Traffic Pattern Changed		
 <p>C-063</p>	<p>Sign sizes (mm)</p> <p>C-063 (750 x 750)</p> <p>C-063-xx (1200 x 1200)</p>	<p>The TRAFFIC PATTERN CHANGED C-063 sign should be used in advance of a work zone after the completion of construction to advise drivers of significant traffic pattern changes where:</p> <ul style="list-style-type: none"> • the travel path has been altered; • lanes have been added or removed; and/or • traffic control has been changed at an intersection (e.g., signal added, two-way stop changed to four-way stop). <p>The C-063 sign typically remains in place for three months following the change.</p>

C-064 Signal Operation Changed		
 <p>C-064</p>	<p>Sign sizes (mm)</p> <p>C-064 (750 x 750)</p> <p>C-064-xx (1200 x 1200)</p>	<p>The SIGNAL OPERATION CHANGED C-064 sign should be used in advance of the work zone after the completion of construction to advise drivers that the operation of an existing signalized intersection has been altered.</p> <p>Examples may include the addition of protected left turns or other changes to the signal phasing.</p> <p>The C-064 sign typically remains in place for three months following the change.</p> <p>Note: The use of this sign requires the approval of the Road Authority.</p>
C-066 Signal Out of Order		
 <p>C-066</p>	<p>Sign sizes (mm)</p> <p>C-066 (750 x 750)</p> <p>C-066-xx (1200 x 1200)</p>	<p>The SIGNAL OUT OF ORDER C-066 sign should be used in advance of an intersection where an existing signal has temporarily been set to flash or turned off because of construction activities.</p> <p>If traffic is still using the intersection, it should be controlled and directed safely through the intersection by Traffic Control Persons or police officers.</p>

C-067 Runaway Lane Closed		
 <p>C-067</p>  <p>C-067-T</p>	<p>Sign sizes (mm)</p> <p>C-067 (750 x 750)</p> <p>C-067-x (900 x 900)</p> <p>C-067-xx (1200 x 1200)</p> <p>C-067-T (450 x 600)</p> <p>C-067-Tx (600 x 750)</p> <p>C-067-Txx (750 x 900)</p>	<p>The RUNAWAY LANE CLOSED C-067 sign should be used in advance of any closure of a runaway lane.</p> <p>The C-067 sign and XXX m AHEAD C-067-Tab distance tab should typically be positioned at least 200 metres or Distance A—whichever is greater—in advance of the closed lane.</p> <p>Distance A values are those shown for Construction Sign Spacing in Table B – Device Spacing Lengths—see Section 6.6 or Appendix F.</p> <p>The C-067 sign should be covered or removed as soon as possible once the runaway lane is available again.</p>
C-069 Barrier Removed		
 <p>C-069</p>	<p>Sign sizes (mm)</p> <p>C-069 (750 x 750)</p> <p>C-069-x (900 x 900)</p>	<p>The BARRIER REMOVED C-069 sign should be used in advance of locations where an existing median or roadside barrier has been removed because of construction activity.</p>

C-070 Towing Operation		
 <p>C-070-1</p>	<p>Sign sizes (mm)</p> <p>C-070-1 (750 x 750)</p> <p>C-070-1x (900 x 900)</p> <p>C-070-1xx (1200 x 1200)</p>	<p>The TOWING OPERATION C-070-2 sign may be used during tow truck recovery operations to warn drivers of the presence of tow trucks and workers ahead.</p> <p>The TOWING OPERATION AHEAD C-070-1 or TOW TRUCK AHEAD C-071-1 sign may be used in conjunction with the TOW OPERATION C-070-2 sign to provide additional warning of tow truck recovery operations.</p> <p>See Section 19.1 Tow Truck Recovery Operations for additional guidance on tow truck recovery operations.</p>
 <p>C-070-2</p>	<p>C-070-2 (750 x 750)</p> <p>C-070-2x (900 x 900)</p> <p>C-070-2xx (1200 x 1200)</p>	
C-071 Tow Truck		
 <p>C-071-1</p>	<p>Sign sizes (mm)</p> <p>C-071-1 (750 x 750)</p> <p>C-071-1x (900 x 900)</p> <p>C-071-1xx (1200 x 1200)</p>	<p>The TOW TRUCK C-071-2 sign may be used during towing operations, or to indicate the presence of a tow truck ahead.</p> <p>The TOW TRUCK AHEAD C-071-1 or TOWING OPERATION AHEAD C-070-1 signs may be used in conjunction with the TOW TRUCK C-071-2 sign to provide additional warning.</p> <p>See Section 19.1 Tow Truck Recovery Operations for additional guidance on tow truck recovery operations.</p>
 <p>C-071-2</p>	<p>C-071-2 (750 x 750)</p> <p>C-071-2x (900 x 900)</p> <p>C-071-2xx (1200 x 1200)</p>	

C-072 Grader Working		
 <p>C-072</p>	<p>Sign sizes (mm)</p> <p>C-072 (750 x 750)</p> <p>C-072-xx (1200 x 1200)</p>	<p>The GRADER WORKING C-072 sign should be used in advance of a section where a grader is operating for roadway or shoulder gravelling.</p> <p>Where a roadway (rather than a shoulder) is being graded, a second C-072 sign should be erected to face opposing traffic beyond the end of the section being graded (maximum 8 kilometres), and a YIELD TO ONCOMING TRAFFIC R-056-1 sign should be displayed on the rear of the grader.</p> <p>If the grading operation uses a shadow vehicle on the shoulder behind the grader, the C-072 sign for traffic travelling in the direction of the operation may be displayed conspicuously on the rear of the shadow vehicle.</p>
C-074 Mower Working		
 <p>C-074</p>	<p>Sign sizes (mm)</p> <p>C-074 (750 x 750)</p> <p>C-074-x (900 x 900)</p>	<p>The MOWER WORKING C-074 sign should be used to warn drivers that a mower is working adjacent to the roadway and that the operator may encroach onto the shoulder—or even into the travel lane if the shoulder is narrow—to avoid obstructions like culvert ends, sign posts, delineators, etc.</p> <p>This is continuously slow-moving work, as shown in Section 10: Traffic Control Layouts – Mobile Work.</p> <p>The sign is not required if the mower is consistently working well clear of the travelled roadway and shoulder.</p> <p>If the mowing operation uses a shadow vehicle on the shoulder behind the mower, the C-074 sign for traffic travelling in the direction of the operation may be displayed conspicuously on the rear of the shadow vehicle.</p>

C-076 Sweeper Working		
 <p>C-076</p>	<p>Sign sizes (mm)</p> <p>C-076 (750 x 750)</p> <p>C-076-x (900 x 900)</p>	<p>The SWEEPER WORKING C-076 sign should be used in advance of a section where a mechanical sweeper is being used to clean a paved roadway or shoulder.</p> <p>This is continuously slow-moving work, as shown in Section 10: Traffic Control Layouts – Mobile Work.</p> <p>Where a travel lane (rather than a shoulder) is being swept on a two-lane, two-way roadway, a second C-076 sign should be erected to face opposing traffic beyond the end of the section being cleaned (maximum 8 kilometres), and a YIELD TO ONCOMING TRAFFIC R-056-1 sign must be displayed on the rear of the sweeper.</p> <p>If the sweeping operation uses a shadow vehicle on the shoulder behind the sweeper, the C-076 sign for traffic travelling in the direction of the operation may be displayed conspicuously on the rear of the shadow vehicle.</p>
C-078 Snow Blower Ahead		
 <p>C-078</p>	<p>Sign sizes (mm)</p> <p>C-078 (750 x 750)</p> <p>C-078-x (900 x 900)</p>	<p>The SNOW BLOWER AHEAD C-078 sign should be used in advance of a section where a snow blower is being used.</p> <p>This is continuously slow-moving work, as shown in Section 10: Traffic Control Layouts – Mobile Work.</p> <p>When the snow blower is on a two-lane, two-way roadway, a second C-078 sign should be erected to face opposing traffic beyond the end of the section being cleaned (maximum 8 kilometres), and a YIELD TO ONCOMING TRAFFIC R-056-1 sign must be displayed on the rear of the snow blower.</p> <p>If the snow blowing operation uses a shadow vehicle on the shoulder behind the snow blower, the C-078 sign for traffic travelling in the direction of the operation may be displayed conspicuously on the rear of the shadow vehicle.</p>

C-079-1 Tree Work		
 <p>C-079-1A</p>	<p>Sign sizes (mm)</p> <p>C-079-1A (750 x 750)</p> <p>C-079-1Ax (900 x 900)</p> <p>C-079-1Axx (1200 x 1200)</p>	<p>The TREE WORK C-079-1B sign may be used in advance of a section where tree work is being completed. This includes landscaping of trees or tree falling work. It warns motorists of the potential of debris and to exercise caution when driving through the landscaping or tree falling section.</p> <p>The TREE WORK AHEAD C-079-1A sign may be used as a supplement to the TREE WORK C-079-1B sign for additional warning of the work taking place.</p>
 <p>C-079-1B</p>	<p>C-079-1B (750 x 750)</p> <p>C-079-1Bx (900 x 900)</p> <p>C-079-1Bxx (1200 x 1200)</p>	
C-079-2 Utility Work		
 <p>C-079-2A</p>	<p>Sign sizes (mm)</p> <p>C-079-2A (750 x 750)</p> <p>C-079-2Ax (900 x 900)</p> <p>C-079-2Axx (1200 x 1200)</p>	<p>The UTILITY WORK C-079-2B sign may be used in advance of a section where utility work is being completed. This includes work being completed for, or by companies such as power, gas, water, sewer, telecommunications, television, etc.</p> <p>The UTILITY WORK AHEAD C-079-2A sign may be used as a supplement to the UTILITY WORK C-079-2B sign for additional warning of the work taking place.</p>
 <p>C-079-2B</p>	<p>C-079-2B (750 x 750)</p> <p>C-079-2Bx (900 x 900)</p> <p>C-079-2Bxx (1200 x 1200)</p>	

C-079-3 Landscape Work		
 <p>C-079-3A</p>	<p>Sign sizes (mm)</p> <p>C-079-3A (750 x 750)</p> <p>C-079-3Ax (900 x 900)</p> <p>C-079-3Axx (1200 x 1200)</p>	<p>The LANDSCAPE WORK C-079-3B sign may be used in advance of a section where landscaping is being completed. It warns motorists of the potential of workers close to the travelled roadway, debris, and to exercise caution when driving through the landscaping section.</p>
 <p>C-079-3B</p>	<p>C-079-3B (750 x 750)</p> <p>C-079-3Bx (900 x 900)</p> <p>C-079-3Bxx (1200 x 1200)</p>	<p>The LANDSCAPE WORK AHEAD C-079-3A sign may be used as a supplement to the LANDSCAPE WORK C-079-3B sign for additional warning of the landscaping taking place.</p>

C-080-T Construction Speed Zone Tab		
 <p>C-080-T</p>	<p>Sign sizes (mm)</p> <p>C-080-Ta (600 x 300)</p> <p>C-080-Tax (750 x 450)</p> <p>C-080-Taxx (900 x 450)</p> <p>C-080-Taxxx (1220 x 610)</p>	<p>Construction Speed Zones may be installed only with the approval of the Road Authority.</p> <p>The CONSTRUCTION SPEED ZONE C-080-T tab, when erected below the MAXIMUM SPEED AHEAD R-003 and MAXIMUM SPEED R-004 signs, establishes a legally lowered Construction Speed Zone.</p> <p>These signs are normally post-mounted.</p> <p>Construction Speed Zones are generally established for long-duration projects on which a reduction in the normal speed limit is considered necessary.</p>
	<p>C-080-Tb (600 x 300)</p> <p>C-080-Tbx (750 x 450)</p> <p>C-080-Tbxx (900 x 450)</p> <p>C-080-Tbxxx (1220 x 610)</p>	<p>The SPECIAL EVENT SPEED ZONE C-080-Tb tab may be used in place of a CONSTRUCTION SPEED ZONE C-080-Ta tab if there is a special event taking place. Special events (such as parades, races, fundraising events, and filming) are characterized as events which have been given a Special Event Permit by the Road Authority.</p> <p>If there are any R-003 or R-004 signs showing the normal maximum speed on the approach to, or within a Construction Speed Zone or Special Event Speed Zone, they are covered or removed whenever the lower speed limit is in effect.</p> <p>The end of a Construction Speed Zone or Special Event Speed Zone should be indicated by an R-004 sign showing the normal maximum speed.</p> <p>C-080-Taxxx and C-080-Tbxxx tabs are to be used on Variable Speed Limit System signs and require approval from the Road Authority.</p>
	 <p>C-080-Tb</p>	

C-082 Min \$196 Fine –Speeding in Work Zones		
 <p>C-082</p>	<p>Sign sizes (mm)</p> <p>C-082 (900 x 450)</p> <p>C-082-xx (1830 x 915)</p>	<p>The MINIMUM \$196 FINE – SPEEDING IN WORK ZONES C-082 sign may be used as a speed management tool in areas where drivers have been failing to adjust speed or failing to adhere to the regulatory or construction speed limit.</p> <p>When used in work zones in which a Construction Speed Zone exists, the C-082 sign should be posted in the advance warning area ahead of the work activity area.</p> <p>C-082 signs may also be installed ahead of TCP locations. The C-082 sign may also be used as a standalone sign for speed management throughout the work zone.</p>
C-084 Police Enforcement Ahead		
 <p>C-084</p>	<p>Sign sizes (mm)</p> <p>C-084 (750 x 750)*</p> <p>C-084-x (900 x 900)*</p>	<p>The POLICE ENFORCEMENT AHEAD C-084 sign may be used when a police enforcement event is under way within or in close proximity to a work zone.</p> <p>It should be positioned 100 to 500 metres ahead of the enforcement location.</p> <p>The C-084 sign should be removed or covered when there is no police presence.</p>

C-085 Road Closure Info		
 C-085-1	Sign sizes (mm) C-085-1 (900 x 900) C-085-1x (1200 x 1200)	The ROAD CLOSURE INFO C-085 directional signs are used to direct traffic to a pullout area which contains additional information (custom signs), regarding the road closure.
 C-085-2L	C-085-2L (900 x 900) C-085-2Lx (1200 x 1200)	Many Ministry rural road projects impact access to areas, such as recreational areas. Therefore, this type of road closure information gives the road authority the ability to provide additional information regarding the duration and operational impacts of the closure. This information is often provided prior to the commencement of the road closure to allow locals and other road users time to prepare accordingly.
 C-085-2R	C-085-2R (900 x 900) C-085-2Rx (1200 x 1200)	Depending on the complexity and amount of information provided for a project, this information may be more suited to a pullout area where plenty of time is available for drivers to read and understand. A limited amount of information can be relayed to drivers when vehicles are in motion and travelling through a work zone.
 C-085-3L	C-085-3L (900 x 900) C-085-3Lx (1200 x 1200)	
 C-085-3R	C-085-3R (900 x 900) C-085-3Rx (1200 x 1200)	

C-086 Thank You – Resume Speed		
 <p>C-086-1</p>  <p>C-086-2</p>	<p>Sign sizes (mm)</p> <p>C-086-1 (450 x 900)</p> <p>C-086-2 (1830 x 1220)*</p>	<p>The THANK YOU – RESUME SPEED C-086-1 sign should be used to mark the end of a reduced speed zone that has been established as a Temporary Speed Zone or a Construction Speed Zone.</p> <p>It may also be used at the downstream end of a work activity area through which traffic has been warned to reduce speed by a REDUCE SPEED C-032 sign.</p> <p>On large projects where a CONSTRUCTION PROJECT C-035 sign is used, the END OF PROJECT – THANK YOU RESUME SPEED C-086-2 sign should be used at the end of the work zone if a lowered or reduced speed zone was in effect in the work zone.</p>
C-088 Work Zone Ends		
 <p>C-088</p>	<p>Sign sizes (mm)</p> <p>C-088 (600 x 600)</p> <p>C-088-x (900 x 900)</p>	<p>The WORK ZONE ENDS C-088 sign should be used to indicate the end of a work zone.</p> <p>This sign may be useful to identify the end of a large project that has multiple work activity areas within one large project area.</p> <p>The C-088 sign is generally not required for projects that are very short in length, or for projects for which the end of the work is self-evident.</p>
C-089 Left Lane Must Turn Left		
 <p>C-089</p>	<p>Sign sizes (mm)</p> <p>C-089 (750 x 750)</p> <p>C-089-x (900 x 900)</p> <p>C-089-xx (1200 x 1200)</p>	<p>The LEFT LANE MUST TURN LEFT C-089 sign is used in advance of a lane closure at a multilane intersection where the typical lane assignment is disrupted by a lane closure, and traffic in the left lane can now turn only left, whereas previously that lane may have been a left or through lane.</p>

C-090 Temporary Slow Marker		
 <p>C-090</p>	<p>Sign sizes (mm)</p> <p>C-090 (300 x 300)</p>	<p>The TEMPORARY SLOW C-090 marker is warranted for emergency use only in conjunction with the TEMPORARY HAZARD C-092 marker (see below).</p> <p>It may be erected in advance of temporary hazards such as shoulder washouts, fallen rock, potholes, frost heaves, etc. C-090 and C-092 markers are generally mounted on stakes driven into the shoulder so that each marker is approximately one metre above the level of the travelled roadway.</p> <p>Do not use the TEMPORARY SLOW C-090 marker if it appears that the hazard will not be removed promptly.</p> <p>Instead, erect an appropriate temporary warning sign, such as:</p> <ul style="list-style-type: none"> • C-007 Broken Pavement • C-017 Bump or Rough Roadway Ahead • C-059-2 Washout <p>If the severity or length of a hazard is such that either the ADVISORY SPEED C-022 tab or the ADVISORY DISTANCE C-024 tab is required, or both are required, use an appropriate temporary warning sign instead of the C-090 or C-092 marker.</p>

C-092 Temporary Hazard Marker		
 <p>C-092</p>	<p>Sign sizes (mm)</p> <p>C-092 (300 x 300)</p>	<p>The TEMPORARY HAZARD C-092 marker is used with the TEMPORARY SLOW C-090 marker (see above) and other temporary warning signs.</p> <p>It is erected on the shoulder to mark the actual site of a hazardous condition.</p> <p>C-090 and C-092 markers are generally mounted on stakes driven into the shoulder so that each marker is approximately one metre above the level of the travelled roadway.</p> <p>Individual bumps, potholes, or pavement breaks generally require only one C-092 marker for each direction of travel. In the case of a washout or minor rock fall, several C-092 markers may be required to delineate the hazard.</p>
C-111 Stop Ahead		
 <p>C-111</p>	<p>Sign sizes (mm)</p> <p>C-111 (750 x 750)</p> <p>C-111-x (900 x 900)*</p>	<p>The STOP AHEAD C-111 sign is used where the stopping sight distance to a temporary STOP sign is inadequate for the approach speed.</p> <p>It is also used where a STOP sign is temporarily required in a location where regular users of the route would not expect to stop.</p>
C-112 Signal Ahead		
 <p>C-112</p>	<p>Sign sizes (mm)</p> <p>C-112 (750 x 750)</p> <p>C-112-x (900 x 900)*</p>	<p>SIGNAL AHEAD C-112 signs should be used in advance of portable traffic signal installations. The sign is normally post-mounted.</p>

C-114, C-115, and C-116 Checkerboards		
 <p>C-114</p>	<p>Sign sizes (mm)</p> <p>C-114 (750 x 750)</p> <p>C-114-x (1200 x 1200)*</p>	<p>All CHECKERBOARD signs are diamond-shaped warning signs and should never be mounted as squares.</p> <p>The C-114 sign may be used in conjunction with Type III barricades and the ROAD CLOSED R-012 sign to mark roads that have been temporarily dead-ended and where no alternative route is available.</p> <p>The C-114 sign should be post-mounted in the centre of the closed roadway, just behind the barricades.</p>
 <p>C-115</p>	<p>C-115 (750 x 750)</p> <p>C-115-x (1200 x 1200)*</p>	<p>When alternative routes are available, the C-115 and C-116 signs are used as follows:</p> <ul style="list-style-type: none"> Where one alternative option to the closed road is available either to the right or the left, the C-115 sign is substituted for the C-114 sign and similarly positioned. <p>The C-115 may also be used to mark the apex of a sharp temporary curve, in which case it should be post-mounted just off the shoulder on the outside of the curve, and directly in line with the path of approaching traffic.</p>
 <p>C-116</p>	<p>C-116 (750 x 750)</p> <p>C-116-x (1200 x 1200)*</p>	<ul style="list-style-type: none"> Where two alternative options to the closed road are available in the form of both a right turn and left turn, the C-116 sign is substituted for the C-114 sign, and similarly positioned. <p>The C-116 sign may also be used to mark a temporary T-intersection by post-mounting the sign on the far side of the intersecting road to face traffic approaching from the stem of the T. It should be placed in line with the projected centreline of the stem roadway.</p> <p>If necessary, the mounting height of checkerboards may be adjusted above or below the normal height to allow for vertical curvature on the approach.</p>

C-117, C-118, and C-119 Lane Shift		
 C-117-L	Sign sizes (mm) C-117-L/R (750 x 750)	A LANE SHIFT sign should be used to indicate the path vehicles should follow where the roadway alignment is changed because of a lane shift or diversion.
 C-117-R	C-117-L/Rx (900 x 900) C-117-L/Rxx (1200 x 1200)	A LANE SHIFT sign should also be used again where the roadway shifts back to its original alignment if space allows and the sign is appropriate. These signs must not be used to indicate a lane closure or a merge condition.
 C-118-L	C-118-L/R (750 x 750) C-118-L/Rx (900 x 900)	The number of arrows shown on the sign should reflect the number of lanes being shifted.
 C-118-R	C-118-L/Rxx (1200 x 1200)	If the highway is divided and space is available for a sign in the median, LANE SHIFT signs should be placed on both sides of the roadway approaching the diversion.
 C-119-L	C-119-L/R (750 x 750) C-119-L/Rx (900 x 900)	
 C-119-R	C-119-L/Rxx (1200 x 1200)	

C-121-1 Series Roundabout Right-Turn Truck Signs		
 <p>C-121-1</p>	<p>Sign sizes (mm)</p> <p>C-121-1 (750 x 750)</p>	<p>The signs in the C-121 series should be used to convey the right-turn path for trucks in a roundabout.</p>
 <p>C-121-Ta</p>	<p>C-121-Ta (750 x 300)</p>	<p>The right-turn movement is typically the most challenging for trucks in roundabouts.</p>
 <p>C-121-Tb</p>	<p>C-121-Tb (750 x 300)</p>	<p>If the work activity encroaches into the space needed by right-turning trucks in the roundabout, it may still be possible to allow trucks to make the right-turn manoeuvre by instructing drivers to continue around the roundabout so that they re-approach the exit at a wider angle.</p>
C-128 Series Construction Speed Limit Ahead		
 <p>C-128</p>	<p>Sign sizes (mm)</p> <p>C-128-x (900 x 900)</p> <p>C-128-xx (1200 x 1200)</p>	<p>The CONSTRUCTION SPEED LIMIT AHEAD C-128 is used in advance of R-003 and R-004 Construction Speed Zone signs to replace any transition speed zones installed for speed reductions in excess of 30 km/h. They can also be used to provide additional emphasis, where deemed necessary, of a Construction Speed Zone.</p> <p>See Section 2.4.5: Transition Speed Zones for additional guidelines on how this sign should be used.</p>

C-129 Series Added Lane		
 <p>C-129-L</p>	<p>Sign sizes (mm)</p> <p>C-129-L (750 x 750)</p> <p>C-129-Lx (900 x 900)</p> <p>C-129-Lxx (1200 x 1200)</p>	<p>The ADDED LANE C-129-L sign warns motorists of the convergence of two roads, or approaches, where an additional lane (generally 1 km or longer) is added to the mainline highway such that merging is not necessary. The sign placement should be based on site conditions so that it is visible by motorists on both approaches. If this is not possible, signs should be erected on both approaches.</p>
 <p>C-129-R</p>	<p>C-129-R (750 x 750)</p> <p>C-129-Rx (900 x 900)</p> <p>C-129-Rxx (1200 x 1200)</p>	

C-130 Lane Closed Ahead		C-130-Ta/Tb Distance Tabs	
 <p>C-130-L</p>	<p>Sign sizes (mm)</p> <p>C-130-L/R (750 x 750)</p> <p>C-130-L/Rx (900 x 900)</p>	<p>The LANE CLOSED AHEAD C-130-L/R sign should be used in temporary conditions to indicate that the left or right lane is closed ahead on a roadway that has two or more lanes travelling in the same direction.</p> <p>The C-130-L/R sign should be repeated where the speed limit in the advance warning area is 70 km/h or higher, such as shown in Section 8.6: Right Lane Closed and Section 8.7: Left Lane Closed.</p>	
	 <p>C-130-R</p>	<p>C-130-L/Rxx (1200 x 1200)*</p>	<p>The upstream sign of the pair should also display a bottom-mounted distance tab indicating the distance to the beginning of the lane closure taper.</p> <p>C-130-L/R signs are generally placed on the right shoulder, but where adequate space is available on the left or median side, the signing should be repeated on the median across from the right shoulder signage.</p>
 <p>C-130-Ta</p>	<p>C-130-Ta/Tb (600 x 300)</p> <p>C-130-Ta/Tbx (750 x 400)</p>	<p>On conventional highways, the C-130-T distance tab should generally display:</p> <ul style="list-style-type: none"> • 200 m - for speed limits of 70 or 80 km/h • 400 m - for speed limits of 90 or 100 km/h • 600 m - for speed limits of 110 or 120 km/h 	
 <p>C-130-Tb</p>	<p>C-130-Ta/Tbxx (900 x 450)*</p>	<p>The XX KM C-130-Tb distance tab may be used to provide additional warning for all signs in this series.</p>	

C-132 Two-Way Traffic Ahead		
 <p>C-132</p>	<p>Sign sizes (mm)</p> <p>C-132 (750 x 750)</p> <p>C-132-x (900 x 900)*</p>	<p>The TWO-WAY TRAFFIC AHEAD C-132 sign is used to warn drivers of a temporary, undivided, two-lane, two-way roadway.</p> <p>A typical application is where one roadway of a divided highway is closed and the other roadway must carry traffic in both directions.</p> <p>Appropriate signing and other devices should be used to merge traffic on a multilane, one-way roadway into a single lane well in advance of the point where that traffic enters the two-way roadway.</p> <p>A C-132 sign should be mounted on the right of the single lane section and, if space is available, on the left as well.</p> <p>See the TWO-WAY TRAFFIC R-010 sign for information on two-way signing at the beginning of a two-lane, two-way roadway.</p>

C-134 Road Narrows Ahead		
 <p>C-134</p>	<p>Sign sizes (mm)</p> <p>C-134 (750 x 750)</p> <p>C-134-xx (1200 x 1200)</p>	<p>The ROAD NARROWS AHEAD C-134 sign should be used on two-way roads in advance of a temporary reduction in the width of either or both lanes that makes it necessary to warn drivers so that they may pass safely.</p> <p>The reduced width at which safe passing is still possible will depend on such factors as traffic composition, traffic speed and volume, highway alignment, sight distance, etc., but it will generally be about 5.5 metres.</p> <p>If the reduced width is too narrow for safe passing, even at reduced speeds, a one-way operation must be implemented. The C-134 sign is not intended for use on narrow minor roads that have low travel speeds and carry little traffic.</p>
C-135 Narrow Structure Ahead		
C-135-Ta One Lane Tab		
 <p>C-135</p>  <p>C-135-Ta</p>	<p>Sign sizes (mm)</p> <p>C-135 (750 x 750)</p> <p>C-135-x (900 x 900)</p> <p>C-135-Ta (600 x 300)</p> <p>C-135-Tax (750 x 400)</p>	<p>The NARROW STRUCTURE AHEAD C-135 sign is used on a two-lane, two-way roadway in advance of a bridge that has a temporary clear deck width of 5.5 metres or more but less width than the roadway approach.</p> <p>Where the temporary clear width of a bridge deck is less than 5.5 metres, ONE LANE C-135-Ta tabs are placed below the C-135 signs, and a YIELD TO ONCOMING TRAFFIC R-056-1 sign is erected on the approach with the best sight distance across the bridge.</p> <p>Depending on road conditions, such as traffic composition, traffic speed and volume, approach alignment, sight distance, etc., it may be appropriate to designate some bridges as one-way even when the temporary clear deck width is 5.5 metres or more.</p>

C-136 Merging Traffic Ahead		
 <p>C-136-L</p>  <p>C-136-R</p>	<p>Sign sizes (mm)</p> <p>C-136-L (750 x 750)</p> <p>C-136-Lx (900 x 900)</p> <p>C-136-R (750 x 750)</p> <p>C-136-Rx (900 x 900)</p>	<p>The MERGING TRAFFIC AHEAD C-136-L/R sign should be used in advance of all temporary on-ramps and acceleration lanes under repair.</p> <p>The sign is required to warn traffic on the main roadway, regardless of whether the ramp traffic is controlled by a YIELD R-002 sign or a MERGE C-137-1 sign.</p>
C-137-1 Merge		
 <p>C-137-1</p>	<p>Sign sizes (mm)</p> <p>C-137-1 (750 x 750)*</p> <p>C-137-1x (900 x 900)*</p>	<p>The MERGE C-137-1 sign should be used at a temporary freeway on-ramp where there is an acceleration lane of sufficient length for vehicles to reach the freeway speed limit before entering a through lane.</p>
C-137-2 Alternate When Merging		
 <p>C-137-2</p>	<p>Sign sizes (mm)</p> <p>C-137-2 (750 x 750)</p> <p>C-137-2x (900 x 900)</p>	<p>The ALTERNATE WHEN MERGING C-137-2 sign may be used in conjunction with the MERGE C-137-1 sign.</p> <p>It is positioned downstream of the C-137-1 sign at the merge point, which is usually immediately ahead of the beginning of the acceleration lane taper.</p> <p>The C-137-2 sign may also be used to manage merging situations created by lane drops in high-volume areas.</p>

C-137-5LR Merge Arrow		
 <p>C-137-5L</p>	<p>Sign sizes (mm)</p> <p>C-137-5L (750 x 750)</p> <p>C-137-5Lx (900 x 900)</p>	<p>The MERGE ARROW C-137-5L and C-137-5R signs are used to indicate the merge point. They are used in zipper merge situations as outlined in Section 9.18: Lane Closure with Zipper Merge Signing (Queues < 800 m) and Section 9.19: Lane Closure with Zipper Merge Signing (Queues ≥ 800 m).</p>
 <p>C-137-5R</p>	<p>C-137-5R (750 x 750)</p> <p>C-137-5Rx (900 x 900)</p>	

C-137-7 and C-137-8 Through Traffic Merge Left/Right		
 <p>C-137-7</p>	<p>Sign sizes (mm)</p> <p>C-137-7 (750 x 750)</p> <p>C-137-7x (900 x 900)</p> <p>C-137-7xx (1200 x 1200)</p>	<p>A THROUGH TRAFFIC MERGE LEFT C-037-7 sign or a THROUGH TRAFFIC MERGE RIGHT C-037-8 sign is used ahead of a lane closure at a multilane intersection where the typical lane assignment is disrupted by the lane closure.</p> <p>For example, it is used at a multilane intersection where a through lane is closed and drivers must use either the right lane or the left lane to go through the intersection.</p> <p>The C-037-7 and C-037-8 signs are typically positioned following the initial CREW WORKING AHEAD C-004 or CONSTRUCTION AHEAD C-018-1A sign, and may be used either singly or in pairs.</p>
	<p>C-137-8 (750 x 750)</p> <p>C-137-8x (900 x 900)</p> <p>C-137-8xx (1200 x 1200)</p>	

C-138-LR Zipper Merge		
 <p>C-138-L</p>	<p>Sign sizes (mm)</p> <p>C-138-L (1220 x 1830)</p>	<p>The ZIPPER MERGE C-138-LR sign, may be used at merge locations in addition to—or instead of—the ALTERNATE WHEN MERGING C-137-2 sign to promote efficient merging behaviour in congested conditions.</p> <p>The C-138-LR sign should typically be positioned at the merge point, immediately in advance of the beginning of the acceleration lane taper.</p> <p>See Section 9.18: Lane Closure with Zipper Merge Signing (Queues < 800 m) and Section 9.19: Lane Closure with Zipper Merge Signing (Queues ≥ 800 m) for illustrations on how these signs should be placed.</p>
 <p>C-138-R</p>	<p>C-138-R (1220 x 1830)</p>	<p><i>continued →</i></p>

C-138-T Zipper Merge (Optional Tabs to Enhance Information on the Parent Sign)		
 C-138-Ta	Sign sizes (mm) C-138-Ta (1220 x 915)	See Section 9.18: Lane Closure with Zipper Merge Signing (Queues < 800 m) and Section 9.19: Lane Closure with Zipper Merge Signing (Queues ≥ 800 m) for illustrations on how these tabs should be applied with the C-138LR ZIPPER MERGE parent sign.
 C-138-Tb	C-138-Tb (1220 x 1220)	The ALTERNATE WHEN MERGING C-138-Ta tab or the USE BOTH LANES TO MERGE POINT C-138-Tb tab should be used below the sign when the sign is positioned in advance of the merge point because of sight distance problems, conflicts with other signs, or the absence of appropriate mounting space.
 C-138-Tc	C-138-Tc (1220 x 1220)	The USE BOTH LANES DURING BACKUPS C-138-Tc tab is used if long queues are expected. It may be repeated every 1 to 2 km, based on local site conditions, for the estimated maximum queue distance.
 C-138-Td	C-138-Td (1220 x 610)	The TAKE TURNS C-138-Td tab encourages drivers, both merging and those on the main line, to zipper merge and utilize both lanes until a merge point. This tab is used in conjunction with the MERGE ARROW C-137-5LR and/or ZIPPER MERGE C-138-LR signs and are mounted below the parent sign.
 C-138-Te	C-138-Te (1220 x 610)	The TAKE TURNS AT MERGE C-138-Te tab may be used in conjunction with the ROADWAY/LANE CLOSED AHEAD C-030 series signs and is mounted below the parent sign.
 C-138-Tf	C-138-Tf (1220 x 610)	The MERGE LIKE A ZIPPER C-138-Tf tab may be used in conjunction with the ZIPPER MERGE C-138-LR sign and is mounted below the parent sign.

C-141 Slippery Ahead When Wet		
 <p>C-141</p>	<p>Sign sizes (mm)</p> <p>C-141 (750 x 750)</p> <p>C-141-x (900 x 900)</p>	<p>The SLIPPERY AHEAD WHEN WET C-141 sign should be used when there is a possibility of rain or heavy dew on work that has rendered a finished or unfinished road surface potentially more slippery than normal.</p> <p>It may also be required for confirmation on long sections. When appropriate, the C-141 sign may be used in conjunction with the FRESH OIL C-014 sign or other warning-type signs.</p>
C-149 Pavement Ends		
 <p>C-149</p>	<p>Sign sizes (mm)</p> <p>C-149 (750 x 750)</p> <p>C-149-x (900 x 900)</p>	<p>The PAVEMENT ENDS C-149 sign should be used where an asphalt, concrete, or other finished pavement surface ends and a gravel or dirt section begins.</p> <p>If the start of a paved section of roadway appears to be a hazard, the sign may be flipped to warn of the end of a gravel section.</p>

C-154 Hazard Markers		
 <p>C-154-D</p>	<p>Sign sizes (mm)</p> <p>C-154-D (300 x 900)</p>	<p>HAZARD C-154 markers should be used to mark:</p> <ul style="list-style-type: none"> The inside edge of temporary obstructions—such as bridge end posts—that encroach into a through lane or onto the normal shoulder of a highway. The ends or corners of traffic islands that face, and are adjacent to, oncoming traffic.
 <p>C-154-L</p>	<p>C-154-L (300 x 900)</p>	<p>The hazard marker stripes slope downward towards the side or sides of the obstruction by which traffic is allowed to pass:</p> <ul style="list-style-type: none"> DOUBLE HAZARD C-154-D markers are used where traffic travelling in one direction is allowed to proceed to both the left and the right of an obstruction. HAZARD LEFT C-154-L markers are used to mark obstructions on the driver's left. HAZARD RIGHT C-154-R markers are used to mark obstructions on the driver's right.
 <p>C-154-R</p>	<p>C-154-R (300 x 900)</p>	<p>When used to mark obstructions like bridge end posts, the C-154-L/R markers are positioned to mark the inside edge of the obstructions.</p> <p>C-154-L/R markers are mounted on posts immediately in advance of the obstruction being identified, and generally with the bottom of the markers about one metre above the level of the travelled roadway.</p> <p>These are low-mounted devices placed very close to traffic. They will therefore become dirty more quickly than other signs and will require more frequent cleaning, especially to maintain effectiveness at night.</p>
C-162 Chevron Alignment Marker		
 <p>C-162</p>	<p>Sign sizes (mm)</p> <p>C-162 (600 x 750)</p> <p>C-162-x (750 x 900)</p> <p>C-162-xx (900 x 1200)*</p>	<p>CHEVRON ALIGNMENT C-162 markers may be used on the outside of temporary but severe changes in horizontal alignment in conjunction with advance warning signs and other delineation devices.</p> <p>C-162 markers must be placed so that at least three are used and two of them are always visible to drivers as they negotiate the change in alignment.</p>

C-170 Logging Trucks Crossing/Entering Highway		
 <p>C-170-L</p>  <p>C-170-R</p>	<p>Sign sizes (mm)</p> <p>C-170-L (750 x 750)</p> <p>C-170-Lx (900 x 900)</p> <p>C-170-R (750 x 750)</p> <p>C-170-Rx (900 x 900)</p>	<p>The LOGGING TRUCKS CROSSING/ENTERING HIGHWAY C-170-L/R sign should be used temporarily in advance of logging road accesses where logging trucks frequently cross, enter, or leave a roadway. The direction of the sign indicates the direction from which the logging truck will enter the roadway.</p> <p>A NO PASSING FOR 150 m C-172-T sign may be post-mounted below a C-170-L/R sign for the direction of travel in which normal pavement markings indicate that overtaking is permissible.</p> <p>A second C-170-L/R sign and, if required, a C-172-T sign, may be placed on the left shoulder if this is considered necessary. C-170-L/R signs and C-172-T signs should be covered or removed whenever truck hauls are not in progress.</p>
C-172 Trucks Crossing/Entering Highway		
 <p>C-172-L</p>  <p>C-172-R</p>	<p>Sign sizes (mm)</p> <p>C-172-L (750 x 750)</p> <p>C-172-Lx (900 x 900)</p> <p>C-172-R (750 x 750)</p> <p>C-172-Rx (900 x 900)</p>	<p>The TRUCKS CROSSING/ENTERING HIGHWAY C-172-L/R sign should be used temporarily in advance of gravel pit accesses, haul road crossings, etc., where long and/or slow-moving trucks frequently cross, enter, or leave a roadway. The direction of the sign indicates the direction from which the truck will enter the roadway.</p> <p>A NO PASSING FOR 150 m C-172-T sign may be post-mounted below the C-172-L/R sign for the direction of travel in which normal pavement markings indicate that overtaking is permissible.</p> <p>A second C-172-L/R sign and, if required, a C-172-T sign, may be placed on the left shoulder if this is considered necessary. C-172 and C-172-T signs should be covered or removed whenever truck hauls are not in progress.</p>
C-172-T No Passing for 150 m		
 <p>C-172-T</p>	<p>Sign sizes (mm)</p> <p>C-172-T (600 x 450)</p> <p>C-172-Tx (750 x 600)</p>	<p>The NO PASSING FOR 150 m C-172-T sign is used only immediately below C-170-L/R and C-172-L/R signs. It is not required where overtaking is already prohibited by a barrier line, but it should be used in locations where the normal pavement markings permit passing.</p>

C-180 Cattle Drive		
 <p>C-180</p>	<p>Sign sizes (mm)</p> <p>C-180 (750 x 750)</p> <p>C-180-x (900 x 900)</p>	<p>The CATTLE DRIVE C-180 sign should be used instead of the CREW WORKING AHEAD C-004 sign for traffic control involving cattle drives.</p>
C-183 Series Bike Hazard		
 <p>C-183</p>  <p>C-183-Ta</p>  <p>C-183-Tb</p>  <p>C-183-Tc</p>	<p>Sign sizes (mm)</p> <p>C-183 (450 x 450)</p> <p>C-183-Ta (400 x 200)</p> <p>C-183-Tb (400 x 200)</p> <p>C-183-Tc (400 x 200)</p>	<p>The BIKE HAZARD C-183 series is typically used on local or low-speed arterial roadways to advise cyclists of potentially hazardous road conditions in the work zone, including changes to the pavement surface that could affect stability.</p> <p>The BIKE HAZARD C-183 sign should be assembled with the appropriate tab to provide specific information:</p> <ul style="list-style-type: none"> • Use the CYCLISTS USE CAUTION C-183a tab to tell the cyclist what to do. • Use the UNEVEN ROAD C-183b tab or the UNEVEN PATHWAY C-183c tab to describe the nature of the hazard. <p>The C-183 sign and tab should be erected just in advance of the hazard, subject to practical field limitations.</p>
C-184 Cyclist Right-of-Way		
 <p>C-184</p>	<p>Sign sizes (mm)</p> <p>C-184 (750 x 750)</p> <p>C-184x (900 x 900)</p> <p>C-184xx (1200 x 1200)</p>	<p>The CYCLIST RIGHT-OF-WAY “Take the Lane” C-184 sign is to be used where there is limited space for side-by-side vehicle and cyclist operations, and the cyclist should use the centre of the travel lane.</p> <p>It should be used only on low-speed roadways for a limited distance (typically less than 150 metres).</p>

C-185-1 Smoke Ahead C-185-1 Tabs		
 C-185-1	<p>Sign sizes (mm)</p> <p>C-185-1 (750 x 750)</p> <p>C-185-1x (900 x 900)</p>	<p>The SMOKE AHEAD C-185-1 sign should be placed in advance of an area where smoke from a nearby forest fire or controlled burn may obscure the view ahead for drivers.</p> <p>The appropriate CONTROLLED BURN C-185-1Ta tab or FOREST FIRE C-185-1Tb tab must accompany the SMOKE AHEAD sign.</p> <p>The C-185-1 sign and tab should be positioned so that they are seen by drivers who have not yet encountered smoke on the roadway but may be able to see it in the distance.</p>
 C-185-1Ta	<p>C-185-1Ta (600 x 300)</p> <p>C-185-1Ta-x (750 x 450)</p>	<p>Depending on the situation and the severity of the smoke hazard, the C-185-1 sign may be followed by additional signage, such as the REDUCE SPEED C-032 sign or the PREPARE TO STOP C-029 sign.</p>
 C-185-1Tb	<p>C-185-1Tb (600 x 300)</p> <p>C-185-1Tb-x (750 x 450)</p>	<p>Signs in this series may also be used with the ROAD CLOSED R-012 sign.</p> <p>Depending on the wind conditions, the C-185-1 sign may have to be adjusted frequently to remain in advance of the smoke.</p>
C-185-2 Reduced Visibility Hazard C-185-2 Tabs		
 C-185-2	<p>Sign sizes (mm)</p> <p>C-185-2 (750 x 750)</p> <p>C-185-2x (900 x 900)</p>	<p>The REDUCED VISIBILITY HAZARD C-185-2 sign may be used where visibility is reduced by temporary conditions like dust, smoke, or other blowing or suspended particulate matter.</p> <p>If the reduced visibility is expected to continue over two or more kilometres, the signs should be used in conjunction with appropriate tabs such as SMOKE C-185-2Ta and/or REDUCED VISIBILITY NEXT XX KM C-185-2Tb tabs explaining the reason for the reduced visibility and the distance over which it will be encountered.</p>
 C-185-2Ta	<p>C-185-2Ta (600 x 300)</p> <p>C-185-2Ta-x (750 x 450)</p>	<p>The sign should not be used in a work zone as a substitute for dust control methods.</p>
 C-185-2Tb	<p>C-185-2Tb (600 x 300)</p> <p>C-185-2Tb-x (750 x 450)</p>	

C-185-3 Use Headlights – Extreme Dust		
 <p>C-185-3</p>	<p>Sign sizes (mm)</p> <p>C-185-3 (750 x 750)</p> <p>C-185-3x (900 x 900)</p>	<p>The USE HEADLIGHTS – EXTREME DUST C-185-3 sign should be used when a severe dust condition obscures the view ahead for drivers. This may occur on seal coat or graveling operations.</p> <p>To the extent possible, the sign should be positioned in advance of the point at which drivers encounter the dust condition.</p> <p>It may have to be repositioned frequently because of changing wind and weather conditions.</p>
C-185-4 Fire Activity		
 <p>C-185-4A</p>	<p>Sign sizes (mm)</p> <p>C-185-4A (750 x 750)</p> <p>C-185-4Ax (900 x 900)</p> <p>C-185-4Axx (1200 x 1200)</p>	<p>The FIRE ACTIVITY C-185-4B sign may be used in advance of an area with fire activity. It warns motorists of the potential for fire fighting personnel and equipment adjacent to the roadway. It may also warn of smoke and limited visibility.</p> <p>The FIRE ACTIVITY AHEAD C-185-4A sign may be used in conjunction with the FIRE ACTIVITY C-185-4B sign to provide additional warning.</p>
 <p>C-185-4B</p>	<p>C-185-4B (750 x 750)</p> <p>C-185-4Bx (900 x 900)</p> <p>C-185-4Bxx (1200 x 1200)</p>	

C-187 Turn on Headlights in Tunnel C-187-T Tunnel Lighting Work in Progress Tab		
 C-187  C-187-T	<p>Sign sizes (mm)</p> <p>C-187 (750 x 750)*</p> <p>C-187-x (900 x 900)*</p> <p>C-187-T (600 x 450)*</p> <p>C-187-Tx (750 x 450)*</p>	<p>The TURN ON HEADLIGHTS IN TUNNEL C-187 sign and the TUNNEL LIGHTING WORK IN PROGRESS C-187-T tab should be used in advance of tunnels in which workers are present and normal tunnel lighting may be affected.</p>

C-190 Evacuation Route C-190 Tabs		
	<p>Sign sizes (mm)</p>	<p>The EVACUATION ROUTE C-190 signs and tabs should be used in the event of a natural disaster or other event that requires the evacuation of an area.</p>
<p>C-190</p>	<p>C-190 (750 x 750)*</p>	<p>They should be set up to guide drivers along the evacuation route out of the affected area.</p>
	<p>C-190-x (900 x 900)*</p>	<p>The setup for C-190 signs is similar to that for detour route signs, with appropriate directional arrows used in advance of and, where necessary for confirmation, beyond all decision points along the evacuation route to assure drivers that they are following the intended path.</p>
<p>C-190-TaA</p>	<p>C-190-TaA (600 x 300)*</p>	
	<p>C-190-TaA-x (750 x 400)*</p>	
<p>C-190-TaLR</p>	<p>C-190-TaLR (600 x 300)*</p>	
	<p>C-190-TaLR-x (750 x 400)*</p>	

C-201 Road Closed Ahead Local Traffic Only		
 <p>C-201-1</p>  <p>C-201-2</p>  <p>C-201-3</p>	<p>Sign sizes (mm)</p> <p>C-201-1 (1220 x 610)</p> <p>C-201-1x (1830 x 915)</p> <p>C-201-2 (1220 x 610)</p> <p>C-201-2x (1830 x 915)</p> <p>C-201-3 (1220 x 406)</p> <p>C-201-3x (1830 x 610)</p>	<p>The ROAD CLOSED XXX M AHEAD LOCAL TRAFFIC ONLY C-201-1 and ROAD CLOSED XX KM AHEAD LOCAL TRAFFIC ONLY C-201-2 may be used to provide additional warning to motorists of a road closure ahead.</p> <p>The ROAD CLOSED LOCAL TRAFFIC ONLY C-201-3 sign may be placed on the barricade at the beginning of the road closure to indicate that the road is closed, and only local traffic may be allowed.</p> <p>The “LOCAL TRAFFIC ONLY” text may be replaced with custom messaging such as road closure times or dates to provide more information representing local conditions to the road user.</p> <p>See Section 19.6: Roadway Closure with Detour (≤ 60 km/h) and Section 19.7: Roadway Closure with Detour (≥ 70 km/h) for additional guidance on signing road closures.</p>
C-202 Sidewalk Closed		
 <p>C-202</p>	<p>Sign sizes (mm)</p> <p>C-202 (900 x 450)</p> <p>C-202-x (1200 x 600)</p> <p>C-202-xx (1830 x 915)</p>	<p>The SIDEWALK CLOSED C-202 sign should be used where it is necessary to close a sidewalk.</p> <p>It should be placed on a barricade immediately in advance of the closed area, on both approaches to the closed area.</p>

C-203 Sidewalk Closed – Cross Here		
 <p>C-203-L</p>  <p>C-203-R</p>	<p>Sign sizes (mm)</p> <p>C-203-L (900 x 450)</p> <p>C-203-Lx (1200 x 600)</p> <p>C-203-Lxx (1830 x 915)</p> <p>C-203-R (900 x 450)</p> <p>C-203-Rx (1200 x 600)</p> <p>C-203-Rxx (1830 x 915)</p>	<p>The SIDEWALK CLOSED – CROSS HERE C-203-L/R sign is usually mounted on a barricade.</p> <p>It is positioned in advance of the sidewalk closure at an appropriate crossing location so that pedestrians are directed to an appropriate crossing facility, usually an existing intersection or mid-block crosswalk.</p>
C-204 Exit Open		
 <p>C-204</p>	<p>Sign sizes (mm)</p> <p>C-204 (1200 x 900)</p>	<p>The EXIT OPEN C-204 sign is used in advance of an exit ramp that is open but for which the open status may not be clear to drivers because of road work taking place in the immediate vicinity of the ramp.</p> <p>This sign may be placed as a standalone sign or mounted below a guide sign for the exit.</p>
C-205-A Exit Closed Ahead		
 <p>C-205-A</p>	<p>Sign sizes (mm)</p> <p>C-205-A (750 x 750)</p> <p>C-205-Ax (900 x 900)</p> <p>C-205-Axx (1200 x 1200)</p>	<p>The EXIT CLOSED AHEAD C-205-A sign should be used in advance of a temporarily closed exit ramp.</p> <p>In areas where there are two or more exits in close proximity, a C-130-T distance tab may be used with the C-205-A sign to provide clarity about which exit is closed.</p>

B-C-002 Bicycle Lane Closed		
 <p>B-C-002</p>	<p>Sign sizes (mm)</p> <p>B-C-002 (450 x 450)*</p>	<p>The BICYCLE LANE CLOSED B-C-002 sign should be used where a bicycle lane or route is temporarily closed.</p> <p>Wherever possible, this sign should be accompanied by BICYCLE DETOUR B-C-004 signs to direct cyclists around the closed area.</p>
B-C-004 Bicycle Detour		
 <p>B-C-004-1A</p>	<p>Sign sizes (mm)</p> <p>B-C-004-1A (450 x 450)*</p>	<p>The appropriate BICYCLE DETOUR B-C-004 sign should be used immediately in advance of all decision points along a cycling detour route.</p> <p>Confirmation signs should also be placed following decision points to assure cyclists that they are following the intended route.</p>
 <p>B-C-004-1L</p>	<p>B-C-004-1L (450 x 450)*</p>	<ul style="list-style-type: none"> • The BICYCLE DETOUR AHEAD B-C-004-1A sign may be used after a BICYCLE LANE CLOSED B-C-002 sign to indicate that the detour is ahead, and as a confirmation sign along the detour route.
 <p>B-C-004-1R</p>	<p>B-C-004-1R (450 x 450)*</p>	<ul style="list-style-type: none"> • The BICYCLE DETOUR LEFT B-C-004-1L and BICYCLE DETOUR RIGHT B-C-004-1R signs should be used to indicate decision points along the detour route.
 <p>B-C-004-2</p>	<p>B-C-004-2 (450 x 450)*</p>	<ul style="list-style-type: none"> • At the end of the detour, the BICYCLE DETOUR ENDS B-C-004-2 sign should be used to indicate that cyclists are now returned to the original route. • The B-C-004 tabs indicate distances related to the detour route: <ul style="list-style-type: none"> - Tab B-C-004-Ta should be used at the beginning of the detour to inform cyclists of the overall length of the detour. - Tabs B-C-004-Tb and B-C-004-Tc may be used in conjunction with the appropriate B-C-004-1 sign to indicate the distance between decision points for improved cyclist navigation. <p style="text-align: right;"><i>continued →</i></p>

B-C-004 Bicycle Detour (continued)		
 B-C-004-Ta	Sign sizes (mm) B-C-004 Ta (400 x 200)*	Where the detour route for drivers and cyclists is the same, bicycle detour signs are not necessary because cyclists may follow the general purpose C-005 and C-006 construction detour signs.
 B-C-004-Tb	B-C-004 Tb (400 x 200)*	
 B-C-004-Tc	B-C-004 Tc (400 x 200)*	
B-C-020 Bicycles and Pedestrians Slow		
B-C-020-T Watch for Pedestrians Tab		
 B-C-020	Sign sizes (mm) B-C-020 (450 x 450)*	The BICYCLE AND PEDESTRIANS SLOW B-C-020 sign should be used where pedestrian-cyclist interaction is changed because of construction activity. Examples of situations where this sign should be used are: <ul style="list-style-type: none"> • a shared path that is narrowed during construction • a formerly exclusive cycling facility that is now temporarily shared with pedestrians • a location at which pedestrians may be unexpectedly crossing a cycling facility The WATCH FOR PEDESTRIANS B-C-020-T tab should be used in conjunction with the B-C-020 sign to clarify why cyclists are expected to slow.
 B-C-020-T	B-C-020-T (400 x 200)*	

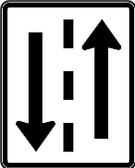
B.2.2 Regulatory Signs

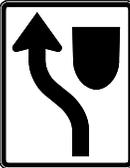
Regulatory signs impose legal requirements and may not be used without permission from the Road Authority. They are typically either square or rectangular—with the long dimension vertical—and typically display black messages on white backgrounds or vice versa.

R-001 Stop R-001 Tabs		
 R-001	Sign sizes (mm) R-001 (750 x 750) R-001-x (900 x 900) R-001-xx (1200 x 1200)	The STOP R-001 sign may be required to assign the normal right-of-way rule at temporary intersections. The R-001 sign should be mounted at a height of approximately 1.5 to 2.0 metres and in approximately the same position as a permanent STOP sign. Where all approaches to a three- or four-leg temporary intersection are controlled by R-001 signs, the signs should be supplemented with R-001 tabs indicating the number of approaches involved.
	R-001-Ta (450 x 250) R-001-Tax (600 x 300) R-001-Taxx (750 x 400)	If a temporary STOP sign is not clearly visible for the safe stopping distance on the approach, a STOP AHEAD C-111 sign is required to alert drivers to the upcoming R-001 sign. A STOP AHEAD C-111 sign may also be needed if a temporary STOP sign is to be installed at a location where drivers would not normally expect to find one.
	R-001-Tb (450 x 250) R-001-Tbx (600 x 300) R-001-Tbxx (750 x 400)	
 R-001-Tc	R-001-Tc (450 x 250) R-001-Tcx (600 x 300) R-001-Tcxx (750 x 400)	

R-002 Yield		
 <p>R-002</p>	<p>Sign sizes (mm)</p> <p>R-002 (900 x 900)</p> <p>R-002-x (1200 x 1200)</p>	<p>The YIELD R-002 sign may be used in temporary situations where the normal right-of-way rule cannot be applied safely but where a STOP R-001 sign would be overly restrictive.</p> <p>An example of appropriate use of an R-002 sign would be at a temporary freeway on-ramp or other such one-way approach that merges with a through roadway at a narrow angle.</p> <p>A MERGE C-137-1 sign is used instead of a YIELD R-002 sign if an acceleration lane of sufficient length exists for on ramp traffic to reach the through roadway speed limit before entering a through lane.</p> <p>The YIELD R-002 sign should be mounted at a height of approximately 1.5 to 2.0 metres and in approximately the same position as a permanent YIELD sign.</p>

R-003 Maximum XX km/h Ahead R-004 Maximum XX km/h		
 R-003	Sign sizes (mm)	<p>The MAXIMUM SPEED AHEAD R-003 and MAXIMUM SPEED R-004 signs are mounted above C-080-T series tabs (ex. CONSTRUCTION SPEED ZONE) to implement a regulatory Speed Zone where the need for and speed limit of such a zone has been established by the Road Authority.</p> <p>The R-004 and C-080-T assembly shows the approved speed limit, marks the beginning of the Speed Zone, and is used for confirmation throughout the zone.</p> <p>The R-003 and C-080-T combination, showing the same speed limit, is placed upstream of the beginning of the zone.</p> <p>Wherever possible on freeways and other one-way roadways, secondary assemblies should also be mounted on the median or left side.</p> <p>A confirmatory R-004 and C-080-T assembly should be erected 300 to 600 metres downstream of the beginning of the Speed Zone.</p> <p>Other confirmatory assemblies may be required beyond all intervening intersections and on-ramps, and at other intermediate positions on long, uninterrupted rural sections.</p> <p>The oversized R-003 and R-004 signs with C-080-T tabs may be used occasionally at the beginning of other Speed Zones if additional emphasis is required.</p> <p>The standard-sized 600 x 750 mm R-004 sign may be used for confirmation within the zone.</p> <p>The end of a Speed Zone is indicated by an R-004 sign showing the normal maximum speed.</p> <p>Where the end of the Construction Speed Zone coincides with the end of a work zone, the R-004 is preceded by a WORK ZONE ENDS C-088 sign.</p>
	R-003 (600 x 750)	
	R-003-x (750 x 900)	
	R-003-xx (900 x 1200)	
	R-004 (600 x 750)	
	R-004-x (750 x 900)	
 R-004	R-004-xx (900 x 1200)	

R-010 Two-Way Traffic		
 <p>R-010</p>	<p>Sign sizes (mm)</p> <p>R-010 (600 x 750)</p>	<p>The TWO-WAY TRAFFIC R-010 signs are required on both sides of a two-lane, two-way roadway at the point where the two-way section begins.</p> <p>In advance of that point, TWO-WAY TRAFFIC C-132 or W-020 signs must be used to provide advance warning to drivers that the one-way roadway will become a two-lane, two-way roadway.</p> <p>Confirmatory R-010 signs should be installed every 1.0 to 1.5 kilometres along the two-way roadway, and beyond as considered necessary.</p> <p>Locations beyond access points should also be considered for placement of R-010 signs.</p> <p>Special care is required where one direction of a divided roadway is being used temporarily to carry two-way traffic because, among other things, the normal pavement markings are not the correct colours.</p> <p>The R-010 sign should be used at locations where a divided highway illusion may cause drivers to think they are on a one-way roadway when in fact they are on a two-lane, two-way roadway.</p> <p>Typical situations requiring R-010 signs are:</p> <ul style="list-style-type: none"> • construction sites where an expressway or freeway becomes a two-lane highway • locations where grading for a full-width expressway or freeway has been completed but only two lanes are operational • locations where a centreline or median crossover is being implemented
R-012 Road Closed		
R-012-T Local Traffic Only Tab		
 <p>R-012</p>	<p>Sign sizes (mm)</p> <p>R-012 (600 x 450)</p> <p>R-012x (900 x 600)</p> <p>R-012xx</p>	<p>The ROAD CLOSED R-012 sign is used to mark any roadway that has been temporarily closed to all public traffic for the purpose of road construction or maintenance, or because of a temporary emergency condition such as high water or a slide.</p> <p>Barricades should be used to close off the travelled roadway as detailed in Section 4.5.8: Barricades.</p>

 <p>R-012-T</p>	<p>(1200 x 900)</p> <p>R-012-T (600 x 300)</p>	<p>An R-012 sign should be mounted on the highest rail of a barricade placed as close as possible to the centre of the travelled roadway.</p> <p>The LOCAL TRAFFIC ONLY R-012-T tab is used with the R-012 sign if access to private property is being maintained for local traffic along the closed section.</p> <p>In these cases, the positioning of barricades at the closure point should leave enough room at one or both sides for local traffic to enter and leave the closed section safely.</p> <p>The R-012-T tab is erected immediately below or to the right of the R-012 sign.</p>
<p>R-014 Keep Left/Right</p>		
 <p>R-014-L</p>  <p>R-014-R</p>	<p>Sign sizes (mm)</p> <p>R-014-L (600 x 750)</p> <p>R-014-R (600 x 750)</p>	<p>The KEEP LEFT/RIGHT R-014-L/R sign may be used in temporary situations in which traffic must be diverted from its normal path and there is no opportunity to use channelizing devices.</p> <p>Such situations can occur in the vicinity of intersections, as shown in Section 11.12: Two-Lane Closure – Multilane Intersection.</p>

R-015 Turn Control Left/Right R-017-2 No Straight Through R-018 Turn		
 <p>R-015-L</p>	<p>Sign sizes (mm)</p> <p>R-015-L (600 x 600)</p> <p>R-015-Lx (750 x 750)</p> <p>R-015-Lxx (900 x 900)*</p>	<p>The TURN CONTROL signs are used at intersections in both temporary and permanent situations to indicate to approaching traffic that the specified turning or through movements are either prohibited (R-015-L/R and R-017-2) or allowed (R-018).</p> <p>At intersections without traffic signals, the signs are normally post-mounted.</p> <p>At intersections with traffic signals, the signs should be positioned in the vicinity of the applicable traffic signal heads. TURN CONTROL signs apply to all traffic approaching an intersection.</p>
 <p>R-015-R</p>	<p>R-015-R (600 x 600)</p> <p>R-015-Rx (750 x 750)</p> <p>R-015-Rxx (900 x 900)*</p>	<p>These signs should not be confused with, or substituted for, LANE USE signs, which regulate traffic in individual lanes.</p>
 <p>R-017-2</p>	<p>R-017-2 (600 x 600)</p> <p>R-017-2x (750 x 750)</p> <p>R-017-2xx (900 x 900)*</p>	
 <p>R-018</p>	<p>R-018 (600 x 600)</p> <p>R-018-x (750 x 750)</p>	

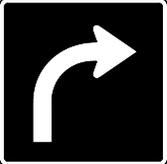
R-016-2LR All Traffic Right/Left		
 <p>R-016-2L</p>	<p>Sign sizes (mm)</p> <p>R-016-2L (600 x 600)</p> <p>R-016-2Lx (750 x 750)</p>	<p>The ALL TRAFFIC RIGHT/LEFT R-016-2L sign is used to indicate that the only movements allowed or available for all traffic is the direction as indicated on the sign (left or right).</p>
 <p>R-019-2R</p>	<p>R-016-2R (600 x 600)</p> <p>R-016-2Rx (750 x 750)</p>	

R-019 Series U-Turn		
 <p>R-019-1</p>	<p>Sign sizes (mm)</p> <p>R-019-1 (600 x 600)</p> <p>R-019-1x (750 x 750)</p> <p>R-019-1xx (900 x 900)</p>	<p>The NO U-TURN R-019-1 sign is used to prevent and/or reiterate to motorists that U-turns are prohibited. This sign may also be used with the EXCEPT MAINTENANCE AND AUTHORIZED VEHICLES R-019-Ta tab at emergency turn around locations where only service and authorized vehicles are allowed to perform U-turns at the break in concrete median barrier.</p> <p>The U-TURN PERMITTED R-019-2 sign may be used to indicate a location where U-turns are permitted, such as for road closures with a dedicated U-turn location for all traffic. In this instance, the ALL TRAFFIC R-019-Tb tab, installed below the U-TURN PERMITTED R-019-2 sign is also recommended.</p>
	<p>R-019-2 (600 x 600)</p> <p>R-019-2x (750 x 750)</p> <p>R-019-2xx (900 x 900)</p>	
 <p>R-019-2</p>	<p>R-019-3 (600 x 600)</p> <p>R-019-3x (750 x 750)</p> <p>R-019-3xx (900 x 900)</p>	<p><i>continued →</i></p>
 <p>R-019-3</p>	<p>R-019-Ta (600 x 450)</p> <p>R-019-Tax (750 x 600)</p> <p>R-019-Taxx (900 x 600)</p>	
 <p>R-019-Ta</p>		

R-019 Series U-Turn (continued)		
 R-019-Tb	Sign sizes (mm) R-019-Tb (600 x 300) R-019-Tbx (750 x 400) R-019-Tbxx (900 x 450)	The ALL TRAFFIC R-019-Tb may be used with any of the turn control signs in this series to emphasize that the turn control as specified by the parent sign is to be applied to all approaching traffic regardless of vehicle/road user type. The X00 M R-019-Tc and XX KM R-019-Td distance tabs may be used with any of the signs in the regulatory series to provide additional distance information. See Section 19.3: Roadway Closure – Two-Lane, Two-Way Roadway and Section 19.4: Roadway Closure – Multilane Roadway for how these signs may be used.
	R-019-Tc (600 x 300) R-019-Tcx (750 x 400) R-019-Tcxx (900 x 450)	
	R-019-Td (600 x 300) R-019-Tdx (750 x 400) R-019-Tdxx (900 x 450)	
 R-019-Tc		
 R-019-Td		

R-020 No Passing for XXX m		
 <p>R-020</p>	<p>Sign sizes (mm)</p> <p>R-020 (600 x 450)</p> <p>R-020-x (750 x 600)</p>	<p>The NO PASSING FOR XXX m R-020 sign is used only immediately below DO NOT PASS R-022-1 signs when the passing prohibition is relatively short (i.e., ≤ 900 metres).</p> <p>It is not required where overtaking is already prohibited by a barrier line, but should be used in locations where the normal pavement markings permit passing.</p>
R-022-1 Do Not Pass		
R-023 Passing Permitted		
 <p>R-022-1</p>	<p>Sign sizes (mm)</p> <p>R-022-1 (600 x 600)</p> <p>R-022-1x (750 x 750)</p> <p>R-022-1xx (900 x 900)*</p>	<p>This pair of signs may be used temporarily on two- or three-lane, two-way roadways where it is necessary to reinforce barrier line markings or where normally permitted passing should be prohibited due to construction activity.</p> <p>A PASSING PERMITTED R-023 sign should always be used in conjunction with a preceding DO NOT PASS R-022-1 sign to mark the end of the No Passing Zone.</p> <p>If the section of road over which passing is prohibited is of considerable length, one or more intermediate R-022-1 signs may be required for confirmation.</p>
 <p>R-023</p>	<p>R-023 (600 x 600)</p> <p>R-023-x (750 x 750)</p> <p>R-023-xx (900 x 900)</p>	

R-025 Stop Line		
 R-025-L	Sign sizes (mm) R-025-L (450 x 600)	The STOP LINE RIGHT R-025-R sign is required only at temporary traffic signal or temporary lane control signal installations where a stop line cannot be placed or where an installed stop line needs additional emphasis. It should generally be post-mounted at the intended stop location and to the right of approaching traffic.
 R-025-R	R-025-R (450 x 600)	On a one-way roadway or in other situations where more than one lane approaches the temporary signal from the same direction, a STOP LINE LEFT R-025-L sign should be post-mounted on the left side of approaching traffic if a secure location can be found for it. When properly positioned, the arrows on R-025 signs always point inward towards the travelled roadway.
R-056-1 Yield to Oncoming Traffic		
 R-056-1	Sign sizes (mm) R-056-1 (750 x 900)* R-056-1x (900 x 1200)*	The YIELD TO ONCOMING TRAFFIC R-056-1 sign is used to control a single-lane traffic section on what is principally or usually a two-lane, two-way roadway. It is used with other signs, such as: <ul style="list-style-type: none"> • C-030-8 Single Lane Traffic • C-135 Narrow Structure Ahead • C-135-Ta One Lane tab The R-056-1 sign is displayed for only one direction of travel, and should be used only where adequate sight distance, low traffic volumes, and low speeds make it unnecessary to use Traffic Control Persons, temporary traffic signals, or temporary lane control signals. It may also be used on the rear of a work vehicle involved in continuously slow-moving work on a two-lane, two-way roadway.

R-082 and R-083 Lane Use		
	<p>Sign sizes (mm)</p>	<p>The LANE USE R-082-L, R-082-R1, R-083-L, and R-083-R signs are used for both temporary and permanent situations to indicate that drivers should use a specific lane on an approach to an intersection.</p>
<p>R-082-L</p>	<p>R-082-L (750 x 750)</p>	<p>LANE USE signs regulate the lane assignments on approaches to intersections, and should be used where the movement is contrary to either driver expectations or the normal rules of the road.</p>
	<p>R-082-R1 (750 x 750)</p>	<p>Unlike TURN CONTROL signs, these signs are placed in advance of intersections and apply only to specific lanes. For short-duration operations, they may be post-mounted or placed on a temporary sign stand, preferably at least 25 metres in advance of the intersection.</p>
<p>R-082-R1</p>	<p>R-082-R1x (900 x 900)*</p>	<p>For long-duration work, they should be either post-mounted or preferably mounted at a minimum height of 5.5 metres over the centre of the lane or lanes to which they apply.</p>
	<p>R-083-L (750 x 750)</p>	<p>The R-082-L, R-082-R1, R-083-L, and R-083-R signs may be used in a shoulder application when overhead mounting is not practical.</p>
<p>R-083-L</p>	<p>R-083-Lx (900 x 900)*</p>	<p>A RIGHT LANE or LEFT LANE tab should be mounted below the sign if post-mounted on the shoulder of the roadway.</p>
	<p>R-083-R (750 x 750)</p>	
<p>R-083-R</p>	<p>R-083-Rx (900 x 900)*</p>	
R-082-R2 Right Lane Must Turn Right		
	<p>Sign sizes (mm)</p>	<p>The RIGHT LANE MUST TURN RIGHT R-082-R2 sign may be used instead of the LANE USE R-082-R1 sign described above if no suitable location can be found to display the R-082-R1 sign.</p>
<p>R-082-R2</p>	<p>R-082-R2u (600 x 750)</p>	
	<p>R-082-R2 (750 x 900)</p>	
	<p>R-082-R2x (900 x 1200)*</p>	

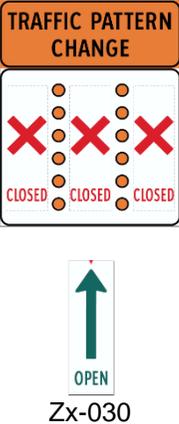
B-R-101 Series Cycling Restriction		
 B-R-101-1	Sign sizes (mm) B-R-101-1 600 x 600	<p>The BICYCLE PROHIBITED B-R-101-1 sign and the WALK BICYCLE B-R-101-2 sign may be used to convey a cycling restriction:</p> <ul style="list-style-type: none"> • The BICYCLE PROHIBITED B-R-101-1 sign indicates that bicycle riding is prohibited beyond this point. • The WALK BICYCLE B-R-101-2 sign is intended for cycling restrictions that are limited in length and where it is feasible to have cyclists dismount and walk their bikes. <p>The B-R-101-Tb tab or the B-R-101-Tc tab should be used in conjunction with the WALK BICYCLE B-R-101-2 sign to provide additional direction to cyclists.</p>
 B-R-101-2	B-R-101-2 600 x 600	
 B-R-101-Tb	B-R-101-Tb 600 x 300	
 B-R-101-Tc	B-R-101-Tc 600 x 300	

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B.2.3 Other Signs

P-081 Idle Reduction		
 <p>P-081-1</p>	<p>Sign sizes (mm)</p> <p>P-081-1 (600 x 750)*</p>	<p>Rehabilitation or Expansion Projects:</p> <p>If required by special provisions in the project contract, the IDLE REDUCTION – TURN ENGINE OFF P-081-1 sign or the IDLE REDUCTION – NO IDLING P-081-2 sign can be incorporated into work zone traffic control signage where queues form under the direction of a Traffic Control Person or traffic control devices during daylight hours.</p> <p>Smaller Projects:</p> <p>Projects under \$500,000 in value can incorporate P-081 signs into work zone traffic control signage if:</p> <ul style="list-style-type: none"> • the project duration is expected to exceed three weeks; • the project is located in a high-traffic area; and • the Road Authority approves the use of these signs. <p>Installation Instructions:</p> <p>The sign must be placed downstream of the TRAFFIC CONTROL PERSON AHEAD C-001-1 sign.</p> <p>The DAYLIGHT HOURS ONLY P-081-Tb tab must be installed if traffic stoppages occur before—or extend beyond—daylight hours.</p> <p>In the event of prolonged stoppages that result in long traffic queues, additional P-081-1 or P-081-2 signs must be placed upstream as required.</p> <p>Exceptions:</p> <p>The use of Idle Reduction signs for traffic control is not recommended if temperatures are consistently below freezing or during night-time projects involving traffic stoppages unless the queue area is lit.</p> <p>The intent of the signs is to encourage drivers to reduce greenhouse gas emissions from idling vehicles. The signs should not be used in circumstances where they could decrease road safety, adversely affect human health, or impede workers’ ability to do their jobs.</p>
 <p>P-081-2</p>	<p>P-081-2 (600 x 750)*</p>	
 <p>P-081-Ta</p>	<p>P-081-Ta (600 x 300)*</p>	
 <p>P-081-Tb</p>	<p>P-081-Tb (600 x 300)*</p>	
 <p>P-081-Tc</p>	<p>P-081-Tc (600 x 300)*</p>	

W-132 Share the Road		
 <p>W-132-1</p>  <p>W-132-1T</p>	<p>Sign sizes (mm)</p> <p>W-132-1u (600 x 600)</p> <p>W-132-1 (750 x 750)</p> <p>W-132-1x (900 x 900)</p> <p>W-132-1Tu (450 x 300)</p> <p>W-132-1T (600 x 300)</p> <p>W-132-1Tx (750 x 450)</p>	<p>The SHARE THE ROAD W-132-1 sign is used to warn motorists that they are to provide adequate driving space for cyclists and other vehicles on the road.</p> <p>The sign also advises motorists and cyclists to use extra caution on the upcoming stretch of road.</p> <p>The W-132-1 sign is to be used where bicycles and motor vehicles share the roadway in a side-by-side operation, such as on narrow lanes or where a road configuration changes, as when a paved shoulder or bicycle lane is discontinued.</p> <p>The SHARE THE ROAD W-132-1T tab may be used to enhance road users' understanding of the W-132-1 sign.</p>
C-186 Command Centre		
 <p>C-186</p>  <p>C-186-Ta</p>	<p>Sign sizes (mm)</p> <p>See Catalogue</p>	<p>The C-186 COMMAND CENTRE sign may be used to indicate a command centre where travellers may report to during emergency operations or evacuations such as wildfire or flooding.</p> <p>The C-186-Ta OFFICE tab may be used in conjunction with the C-186 COMMAND CENTRE sign to indicate the office location within a command centre.</p> <p>Directional arrows may also be used with these signs to direct travellers to the command centre or command centre office location.</p> <p>See the Catalogue of Standard Traffic Signs for more information.</p>

C-326 Series Runaway Lane Closed		
 <p>C-326 Hinged</p>  <p>C-326-OL Series</p>	<p>Sign sizes (mm)</p> <p>C-326 (2440 x 915)</p> <p>C-326-OL (300 x 300)</p>	<p>The RUNAWAY LANE CLOSED C-236 sign is one option available for informing truck drivers of a runaway lane closure. It is typically used for long-duration work extending over multiple days in areas where there are multiple runaway lanes.</p> <p>The C-326 signs are used in conjunction with RUNAWAY LANE CLOSED C-067 signs, and may require alteration of the existing W-322 and W-323 runaway lane signs in order to provide a unique letter identifier for each runaway lane.</p> <p>The C-326 sign should be positioned at the upstream brake check location, in advance of the hill, below an existing STEEP GRADE AHEAD sign as shown at the top of the left column here.</p> <p>Other options for providing advance notice of a runaway lane closure include the use of variable message signs (VMS) and customized signs.</p> <p>Advance notice of a runaway lane closure should be provided at—or in advance of—the nearest upstream brake check location.</p> <p>C-326 signs, VMS, and customized signs may be used in combination.</p>
Zx-030 Traffic Pattern Change (custom sign)		
 <p>Zx-030</p>	<p>Sign sizes (mm)</p> <p>Zx-030 (custom)</p>	<p>For Ministry projects with centreline or median crossovers and counterflow operations, a custom TRAFFIC PATTERN CHANGE Zx-030 sign may also be used as a supplement.</p> <p>Up arrows are used to indicate the direction of travel, and an “X” is used to indicate a lane is closed or for opposing traffic. Use of a down arrow requires approval from the Ministry’s Traffic Operations Engineering team.</p>  <p>Use of a custom Z-sign requires approval from the Road Authority. For additional guidance or use of this custom sign, contact the Ministry’s Traffic and Highway Safety Engineering team.</p>

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Appendix C: Templates for Traffic Management Plans

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Daily Traffic Control Log	C-27

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Appendix C: Templates for Traffic Management Plans

Appendix C contains four templates:

1. **Template for Category 1 Traffic Management Plan:** This template is designed to assist Project Supervisors and Traffic Control Supervisors in assessing traffic control factors and developing a site-appropriate Traffic Management Plan for a Category 1 project.
2. **Daily Sign Check Form:** This form is designed for recording information about the periodic sign checks carried out each day during the course of a project.
3. **Template for Category 2 and 3 Traffic Management Plans:** This template sets out a fundamental approach for organizing and developing Traffic Management Plans for Category 2 and Category 3 projects, and is designed to assist Prime Contractors and Ministry staff with the development and review of Traffic Management Plans for Category 2 and Category 3 projects.
4. **Sample Daily Traffic Control Log:** This sample shows the information which should be recorded about the day's traffic control set up during the course of a project.

As indicated throughout this Manual, the requirements for each project will vary with the characteristics of the traffic, the roadway, and the project itself, and with the contract provisions and conditions established by the Ministry for the Prime Contractor. Each Traffic Management Plan must reflect those project-specific characteristics, provisions, and conditions.

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<p>CONSIDER: Work on roadway Work off roadway Site access and egress Stationary work site Continually slow-moving work site Amount of work site activity Activity changes as work progresses Hours of work – day / night Other: _____ _____ _____ _____</p>	Procedural Factors

TRAFFIC CONTROL PLAN CONSIDERATIONS

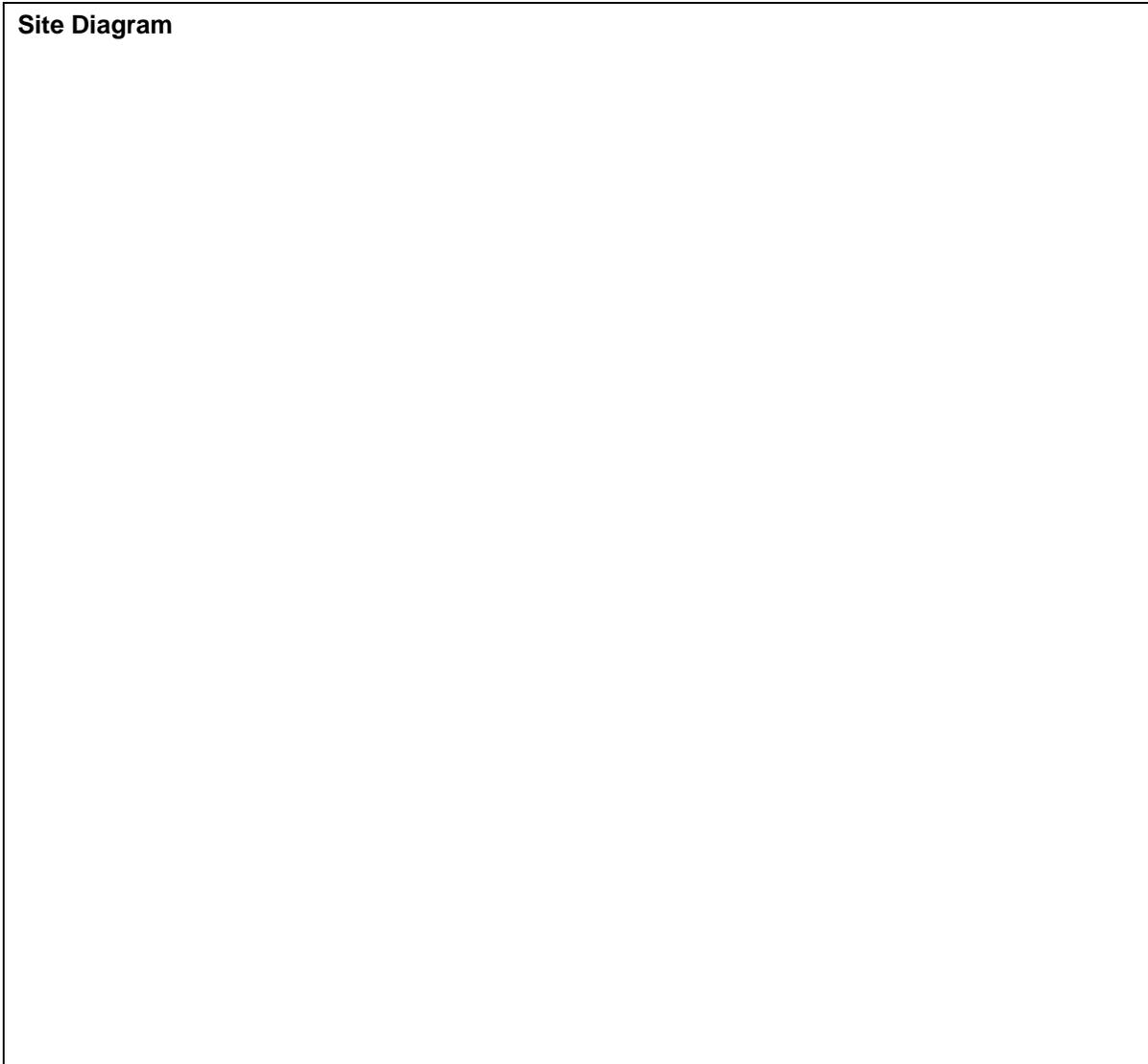
Traffic Control Hierarchy: Consider traffic control devices such as signs, barricades, delineators, flashing arrow boards, changeable message signs, cones, and other traffic control methods before using Traffic Control Persons.

Temporary / Construction Speed Zones: Keep reduced speed zones as small as possible. Temporary Speed Zones should not extend more than 1 km outside the active work area.

Site Factors: Traffic control decisions should reflect site factors identified on the previous page.

<p>CONSIDER: Site and procedural factors Types of traffic control devices Spacing of devices Advanced warning area Transition area Buffer area Work area Termination area Delineation during off hours Moving signs Turning and removing signs Checking devices Traffic Control Persons: - qualifications - hours of work - communications - relief - site instructions, location Other: _____ _____ _____ _____ _____ _____</p>	Traffic Control Plan

Site Diagram



Persons Involved in Developing Traffic Plan		
Attended site discussion of plan:		
Name	Organization	Signature



Ministry of
Transportation
and Infrastructure

TRAFFIC MANAGEMENT PLAN

<Name of Category 2 or Category 3 Project>
<PROJECT No.>

<Date>

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1. Category Definition

Based on the steps outlined in Section 3.2: Project Category Determination in the **Ministry's Traffic Management Manual for Work on Roadways**, the <Project Name> Project calls for a Category <#> Traffic Management Plan.

A Category <#> Traffic Management Plan is characterized by:

-
-
-
-

A Category <#> Traffic Management Plan consists of:

- Traffic Control Plan
- Public Information Plan
- Incident Management Plan
- Implementation Plan

The aim of a Category <#> Traffic Management Plan is to minimize the site-specific risks that were identified for the project.

2. Traffic Control Plan

See also Appendix A: Traffic Control Plan Drawings in this Traffic Management Plan for the proposed layouts of traffic control devices for the project.

Plan Date	Date when plan was initiated.
Latest Revision	Date of latest revision.
Site Name	Name of project.
Plan Developed By	Name of person who developed the plan.
Exact location, direction, and distance to nearest landmarks	Highway number and name of location, LKI, etc.
Project Supervisor	Name of Project Supervisor.
Prime Contractor	Name of Prime Contractor.
Traffic Control Manager	Name of Traffic Control Manager (if applicable).
Traffic Engineer	Name of Traffic Engineer (if applicable).
Traffic Control Supervisor	Name of Traffic Control Supervisor and company.
Traffic Control Persons	Names of TCPs and company.
Project Start Date	
Project Completion Date	

1. Site Factors (Risk Assessment)

Road Alignment	Windy, straight, hilly, banked, etc.
Road Type	Primary, secondary, urban, rural, divided, undivided, arterial, expressway, freeway, number of lanes.
Driver Sight Distances	Consider signs, trees, buildings, and other obstructions that limit visibility.
Approaches	Hill, curves, intersection, accesses, etc.
Work Zone Length	
Affected Lanes	
Regulated Speed	
Reduced Speed Limit	
Traffic Volumes	Approximate traffic volume and type (commercial, residential, agricultural, etc.).
Shoulders	Width, material, etc.
Surrounding Land Use	Commercial, industrial, residential, agricultural, etc.
Residential Areas	Driveways, school buses, etc.
Pedestrians/Cyclists	Is project in an area with potential pedestrians and cyclists?
Weather Conditions	Clear, icy, wet, foggy, snowy, etc.
Site Hazards	List of hazards within project limits.
Concrete Roadside Barriers	Will concrete barriers be removed? If so, what traffic control measures will be in place?

2. Procedural Factors (Risk Assessment)

Work Activity	Type of work: stationary, slow-moving, emergency, brief, short-duration, or long-duration work?
Work On/Off Roadway	Is the work on or off the roadway?
Site Access/Egress	How will equipment access and exit from the site?
Intersections affected by work zone or traffic control devices	
Delays, Closures, Diversions, and Detours	<p>Will delays, closures, diversions, and/or detours be in place?</p> <p>If so, illustrate in Appendix B: Detour Traffic Control Plan Drawing.</p> <p>What is the design speed for the detour?</p> <p>Can it withstand the traffic that will be using the road?</p> <p>For what duration will these be in place?</p>
Hours of Work	<p>The hours during which the work will occur.</p> <p>The time period during which the work will affect traffic.</p>
Dump Site	Location of dump site and access/exit requirements.
Construction Equipment	<p>How will construction equipment be protected during working hours?</p> <p>During off-hours?</p>

3. Special Provisions

Traffic Control Supervisor	Name of Traffic Control Supervisor and company.
Traffic Control Persons	Name of TCPs and company.
Off-Hours Traffic Control	Types of traffic control devices.
Means of Communication	How will TCPs communicate?
Signage	Are signs installed for short-duration or long-duration work? Are the signs spaced in accordance with posted speed?
Portable Dynamic Message Signs (PDMS)	Will PDMS be required? Who will be responsible for updating the sign message(s)?
Dynamic Message Signs (DMS)	Are DMS required? Where will they be located? Who will be responsible for updating the sign message(s)?
Intersections affected by work zone or traffic control devices	Are intersections affected by the work zone or traffic control devices? If so, how will the intersections be controlled? Will additional traffic control devices be required?
Flexible Drums	Will flexible drums be used to delineate lane drops? Will they be used to identify construction accesses to the work activity area?

<p>Traffic Stoppages</p>	<p>Are there any anticipated traffic stoppages?</p> <p>If so, for how long?</p> <p>Will there be single lane alternating traffic?</p>
<p>Layout of Devices</p>	<p>Identify spacing between traffic control devices.</p>
<p>Emergency Vehicles</p>	<p>Will emergency vehicles have clear, unobstructed access to the site?</p> <p>What procedures will be in place to ensure that emergency vehicles are able to access the site without delay?</p>

3. Incident Management Plan

The Incident Management Plan defines processes for responding to unplanned events or traffic incidents in the work zone so that incident response operations within the work site are managed effectively.

The Incident Management Plan requirements are partially determined by the project category (see Section 3.2: Traffic Management Plan Sub-Plans and Section 3.4: Traffic Management Plan Requirements by Category in the **Traffic Management Manual for Work on Roadways**).

Traffic Control Supervisor and Qualifications	Name and qualifications.
Traffic Control Manager and Qualifications	Name and qualifications.
Emergency Response Agencies and Contact Information	Name and contact information (may be listed in Section 6: Contact List).
Types of traffic incident that could occur within work zone	Motor vehicle incident, motor vehicle incident with injuries, vehicle stalls, emergency vehicle transit of work zone, dangerous goods incident, wide load passing, etc.
Procedures for responding to traffic incident that occurs within work zone	<p>Will there be a radio announcement?</p> <p>Who will evaluate the incident?</p> <p>Who will call 911?</p> <p>Will traffic be stopped or will there be single lane alternating traffic?</p> <p>Who will assist the emergency responders through the site, and how?</p> <p>Who will assist if it is necessary to clear vehicles, and how?</p>

<p>Procedures to restore traffic flow around incident site as quickly as possible</p>	<p>How will traffic movement be restored?</p> <p>Will traffic control devices be used?</p> <p>If so, how?</p>
<p>Procedures to clear incident and restore normal project traffic operations as soon as possible</p>	<p>How will the incident be cleared to restore traffic movement?</p> <p>How many TCPs are required?</p>
<p>Procedure to inform and update Ministry regarding incident in work zone</p>	<p>What is the procedure for advising the Ministry that an incident occurred, what response measures are being taken, what clearance measures are required, and what the estimated clearance time will be?</p>
<p>Procedure to inform travelling public of estimated duration of delay and alternative routes (if applicable)</p>	<p>Will DMS or PDMS be used to display information?</p> <p>Will the information be on DriveBC?</p>
<p>Incident Reporting</p>	<p>Who will provide details to the Ministry?</p> <p>What is the process for incident follow-up?</p>
<p>Investigation Process</p>	<p>Who will lead the incident investigation?</p> <p>What investigation process will be used to assess the incident and those involved?</p>
<p>Review and Continuous Improvement Process</p>	<p>How incidents will be reviewed and followed up to reduce the severity and frequency of future incidents?</p>

4. Public Information Plan

The Public Information Plan identifies actions and procedures for informing the travelling public, project stakeholders, and the Ministry of current traffic operations and planned changes to traffic operations.

See also Section 3.2: Traffic Management Plan Sub-Plans and Section 3.4: Traffic Management Plan Requirements by Category in the **Traffic Management Manual for Work on Roadways**.

<p>Process for routinely notifying Ministry of changes to scheduled work plans</p>	<p>Who will be responsible for the changes?</p> <p>What is the person's title?</p>
<p>Process for notifying travelling public of scheduled traffic delays and project duration</p>	<p>Identify the forms of communication to be used [DriveBC, radio, project signs, overhead Dynamic Message Signs (DMS), Portable Dynamic Message Signs (PDMS), public meetings, etc.].</p>
<p>Process for notifying travelling public of unscheduled traffic delays</p>	<p>Identify the forms of communication to be used [DriveBC, radio, Twitter, overhead Dynamic Message Signs (DMS), Portable Dynamic Message Signs (PDMS), etc.].</p>
<p>Major user groups for alternating lane closures or road closures</p>	<p>Identify the major user groups (BC Trucking Association, BC Transit, emergency response agencies, school districts, etc.).</p>

5. Implementation Plan

The Implementation Plan identifies responsibilities and procedures for ensuring that traffic management sub-plans are developed and implemented in a coordinated manner.

It identifies the qualifications, responsibilities, and duties of supervisory and management personnel responsible for implementing the Traffic Management Plan and includes the designation of a Traffic Control Manager and a Traffic Control Supervisor.

See also Section 3.2: Traffic Management Plan Sub-Plans and Section 3.4: Traffic Management Plan Requirements by Category in the **Traffic Management Manual for Work on Roadways**.

Traffic Control Manager and Responsibilities	Name, qualifications, responsibilities, and duties.
Traffic Control Supervisor and Responsibilities	Name, qualifications, responsibilities, and duties.
Person who will manage emergency traffic control operations	Name and title.
Person who will maintain daily traffic control logs	Name and title.
Person who will manage Incident Management Plan	Name and title.
Person who will manage Public Information Plan	Name and title.
Person who will monitor inactive work site	Name, title, and responsibilities.

6. Contact List

1. Emergency Response Agencies/Assistance

Agency/Assistance	Contact 1	Contact 2
RCMP		
BC Ambulance		
Fire and Rescue		
HazMat 24 hr	1-800-663-3456	
PEP 24 hr	1-800-663-3456	
Towing Company		
Road Authority Contacts		
Other		

2. Non-Emergency Contacts

Agency	Name	Phone/Fax	Address
WorkSafeBC			
BC Hydro			
Telus			
Maintenance Contractor			
CP Railway			
Local City Office			
First Aid			
Traffic Control Supervisor			
Traffic Control Company			
Other			

3. Prime Contractor's Contact Numbers

Name and Position	Office Number	Cell Phone Number

Appendix A: Traffic Control Plan Drawings

Site Diagram

(Use additional pages as necessary.)

Show all site factors affecting traffic control, traffic control devices, spacing, signs, explanatory notes, North arrow, etc.

Appendix B: Detour Traffic Control Plan Drawings

Site Diagram

(Use additional pages as necessary.)

Show all site factors affecting traffic control, traffic control devices, spacing, signs, explanatory notes, North arrow, etc.

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DAILY TRAFFIC CONTROL LOG

(More than 1 report may need to be completed if the work zone contains more than 1 work area or TCP station)

Date: _____ TCS Name: _____ Initial: _____

Project Name: _____ Work Area: _____

Highway Number/Road Name: _____

Description of Location/GPS Coordinates: _____

Type of Work Taking Place (eg. paving, culvert replacement): _____

Weather: Sunny / Cloudy / Rainy / Foggy / Windy / Snowy / Other: _____

Direction of Closure: Northbound / Southbound / Eastbound / Westbound / Other: _____

Highway Type: 2-lane 2-way / Multi-lane Undivided / Multi-lane Divided / Other: _____

Type of Closure: Fast lane / Slow lane / Sidewalk / Single lane alternating / Road closure / Other

Time Installed: _____ Time Removed: _____

Sketch of Set Up / Reference figure (attached):

Comments: (eg. modifications to any standard drawings, observations, any incidents or near misses which occurred and could have an affect on Traffic Operations for workers or the travelling public)

TCP Names: _____

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Appendix D: Traffic Management Plan Audit Forms

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Appendix D: Traffic Management Plan Audit Forms

Appendix D contains two Traffic Management Plan audit forms that are intended for use by Ministry personnel:

1. The **Traffic Management Plan Documentation Audit Form** is used by Ministry staff to audit a Prime Contractor's Traffic Management Plan prior to the commencement of project works.
2. The **Traffic Management Plan Field Audit Form** is used by Ministry staff to conduct field audits on the effectiveness of the Prime Contractor's Traffic Management Plan and its traffic control layouts or drawings as they relate to the actual site setup.

It is also used by Ministry staff to conduct field audits on road works being undertaken by Ministry crews (e.g., rock scaling, centreline operations, or day labour construction).

The audit forms may also guide traffic management planning by other Road Authorities, and by Prime Contractors if they wish to use the forms or are instructed to do so.

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Traffic Management Plan Documentation Audit Form		
Project Name _____ Project # _____ Location _____ Duration of Work _____ Description of Work _____ Auditor _____ Audit # _____		
DOCUMENTATION AUDIT – PRIOR TO COMMENCEMENT OF WORK		
Rate the Items and Conditions in the Documentation Audit form using these three indicators: ✓ acceptable X not acceptable N/A not applicable		
Item	Conditions	Rating
Traffic Management Plan	The Prime Contractor submitted a Traffic Management Plan to the Road Authority. It was submitted within an acceptable time—i.e., at least 15 working days before the planned commencement of project works or as defined by the Standard Specifications. The Project Category determination process was followed for the Traffic Management Plan. The Traffic Management Plan has all the required sub-plans for the identified Project Category (Traffic Control Plan, Incident Management Plan, Public Information Plan, and Implementation Plan). It has been engineered as required by the contract. It was developed as required by the Special Provisions.	

Item	Conditions	Rating
<p>Traffic Control Plan</p>	<p>The Traffic Control Plan meets the Ministry's minimum requirements for the Project Category identified in the contract or in the Project Category determination process.</p> <p>It includes text descriptions of the location of the work zone, proposed work activities, proposed traffic control measures, and the specific times and dates when work will be undertaken on the roadway.</p> <p>It includes traffic control layouts (schematic diagrams) of the roadway showing the placement and general arrangement of traffic control devices.</p> <p>It includes customized layouts where standard layouts are inadequate. Layouts need not be to scale, but should include dimensions and site-specific characteristics. (Drawings are required for a Traffic Control Plan only if standard layouts are not adequate.)</p> <p>It may include customized drawings of the roadway in the vicinity of the work zone that identify the arrangement of traffic control devices in accordance with the standards identified in Sections 6 through 19 (Traffic Control Layouts) of the Ministry's Traffic Management Manual for Work on Roadways.</p> <p>The drawings include dimensions, and show all painted markings, physical features that may affect traffic operations (signing, guard rails, lamp standards, etc.), road geometry, and lane configurations.</p> <p>The Traffic Control Plan is detailed to the extent appropriate for the complexity of the work or incident.</p> <p>It was prepared by the Prime Contractor, and was shared with all responsible parties before the commencement of the work.</p>	

Item	Conditions	Rating
Incident Management Plan	<p>For large, complex projects, the Incident Management Plan addresses procedures for handling unplanned events and incidents, and includes provisions for incident response.</p> <p>The Incident Management Plan specifically identifies:</p> <ul style="list-style-type: none"> • types of traffic incidents that may occur in the work zone and planned estimated resumption times • procedures for detecting and verifying incidents that occur within the work zone • procedures for responding to incidents • procedures for restoring traffic flow around an incident site as quickly as possible, including the use of detours • procedures for clearing the incident and restoring pre-incident traffic operations as soon as possible • procedures for identifying estimated resumption times • procedures for immediately informing the Road Authority of the incident occurrence, response measures taken, clearance measures planned, estimated clearance time, and actual incident clearance time • procedures for informing major user groups and the travelling public of anticipated delays and the estimated duration of the unplanned traffic pattern change • procedures for reviewing incidents and proposing modifications to the Traffic Management Plan that will enhance the work site's safety and ease of use • duties and responsibilities of the Traffic Control Manager, Traffic Control Supervisor, and Traffic Control Persons with respect to incident response operations • a contact list for emergency response agencies 	

Item	Conditions	Rating
Public Information Plan	<p>The Public Information Plan identifies:</p> <ul style="list-style-type: none"> • major stakeholders and road users that may be affected by the work • types of communication processes that will be used to notify stakeholders and road users of the work • actions/procedures for informing the Road Authority, travelling public, and project stakeholders of current traffic operations and planned changes to traffic operations • actions/procedures for informing major user groups and the travelling public of anticipated delays • actions/procedures for informing major user groups of the estimated duration of unplanned traffic pattern changes 	
Implementation Plan	<p>The Implementation Plan identifies:</p> <ul style="list-style-type: none"> • project phases and milestones for periods when traffic operations may change • specific changes required to traffic operations during various phases of the work • responsibilities and procedures for ensuring that the sub-plans in the Traffic Management Plan are implemented • qualifications, responsibilities, and duties of the management and supervisory personnel who are responsible for implementing the Traffic Management Plan (i.e., Traffic Control Manager and Traffic Control Supervisor) 	

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Traffic Management Plan Field Audit Form		
Project Name _____ Project # _____ Location _____ Duration of Work _____ Description of Work _____ Auditor _____ Audit # _____		
FIELD AUDIT – DURING WORK ACTIVITIES		
Rate the Items and Conditions in the Field Audit form using these three indicators: ✓ acceptable X not acceptable N/A not applicable		
Item	Conditions	Rating
Traffic Management Plan and Traffic Control Plan	The Traffic Management Plan has been updated as the project progresses (changes to work activities that alter traffic control requirements, changes in work activity scheduling, changes to project initiation and/or completion dates, changes to sub-plans, etc.). The Traffic Management Plan has been modified and the changes have been recorded as the work changes.	
Traffic Control Manager (may be same person as Traffic Control Supervisor)	The Traffic Control Manager has: <ul style="list-style-type: none"> exercised full line authority over all onsite Traffic Control Persons finalized traffic control measures directed implementation of the Traffic Control Plan monitored traffic operations to determine the effectiveness of the Traffic Control Plan overseen Traffic Management Plan modifications necessitated by construction changes and the accommodation of special events kept the Traffic Management Plan up-to-date 	

Item	Conditions	Rating
<p>Traffic Control Supervisor (may be same person as Traffic Control Manager)</p>	<p>The Traffic Control Supervisor is not the same person as the Site Supervisor.</p> <p>The Traffic Control Supervisor is qualified and available at all times (i.e., night-time and during weekends).</p> <p>The Traffic Control Supervisor has ensured that:</p> <ul style="list-style-type: none"> • the required traffic control devices are in place • the daily traffic control logs are maintained • the work of Traffic Control Persons is coordinated on the work site • Traffic Control Persons are using the required personal protective clothing and equipment • Traffic Control Persons are positioned in safe locations clear of potential environmental hazards (i.e., rock slides and avalanches) • Traffic Control Persons are performing traffic control duties competently and safely 	

Item	Conditions	Rating
Traffic Control Persons	<p>Signs associated with the Traffic Control Persons are appropriately displayed, and are covered or removed when not required.</p> <p>The Traffic Control Persons working on the project:</p> <ul style="list-style-type: none"> • are qualified and carrying up-to-date certification on the work site • are used appropriately • are wearing appropriate personal protective equipment as stipulated in Part 18 of WorkSafeBC's Occupational Health & Safety Regulation (hard hat with retroreflective strip, safety vest, CSA-approved footwear, wrist and ankle bands) • are using standard signals for traffic control as described in Part 18 of WorkSafeBC's Occupational Health and Safety Regulation • are using traffic control paddles that meet the requirements for a C-027 Traffic Control Paddle • are using adequate and effective communication • are using a red signaling wand during night work and in conditions of poor visibility • are standing in the best possible positions unless circumstances or space requirements are restricted • are aware of a clear escape route • are using precise motions to direct traffic • are clearly directing and adequately controlling traffic 	

Item	Conditions	Rating
<p>Traffic Control Signs and Devices</p>	<p>Signs are appropriate in size and have diamond-grade retroreflectivity.</p> <p>Signage is adequate, and is spaced appropriately in accordance with the Traffic Management Plan for the project or regulatory speed limits throughout the project.</p> <p>Signage adequately communicates the necessary information to all road users (drivers, pedestrians, and cyclists).</p> <p>Signs are visible, clear of debris, free from obstruction, in good condition, and properly displayed.</p> <p>Sign patterns are displayed consistently in both directions throughout the work zone.</p> <p>Speed drops are appropriate to highway and road speed.</p> <p>Signs and devices are installed in accordance with the Traffic Control Plan.</p> <p>Contradicting signs are covered or removed (e.g., normal 100 km/h sign covered or removed when construction speed is 50 km/h; inapplicable signs covered or removed when work site is inactive).</p> <p>All side roads, intersections, and interchanges have been considered, and are signed accordingly.</p> <p>Delineation is suitable and provides a clear message for directing traffic through the work site.</p> <p>Delineation is properly set up and spaced to provide a suitable buffer.</p> <p>Changeable message boards and speed readers are positioned properly in locations most suitable for project and driver visibility, are in good working condition, and are functioning properly.</p> <p>Night hazards have been addressed.</p> <p>Floodlights have been installed where required and are positioned so that they will not create visibility problems for drivers.</p>	

Item	Conditions	Rating
Traffic Control Layout	<p>Sight distance is adequate as drivers approach the work zone, and at all points within the work zone.</p> <p>Layout is consistent with the Traffic Management Plan and Traffic Control Plan (i.e., detours and road closures are considered, and the proper traffic control devices are being used).</p> <p>Layout is organized and clear.</p> <p>Layout is uniform and consistent to ensure that drivers respond properly.</p> <p>Drivers, pedestrians, and cyclists can move easily through the work zone.</p> <p>Layout is such that it encourages drivers, pedestrians, and cyclists to reduce risk.</p> <p>Standard layouts are used for signage and other traffic control devices to meet traffic control requirements.</p> <p>The work zone has an advance warning area in which drivers can adjust their driving in accordance with the conditions.</p> <p>The transition area is easily identified with the proper traffic control devices (i.e., delineator tapers).</p> <p>The buffer space is adequate and allows drivers to stop at a safe distance.</p> <p>The buffer space is free of equipment, workers, materials, and workers' vehicles, with the exception of a buffer vehicle.</p> <p>The work activity area is closed off to drivers by appropriate traffic control devices (i.e., delineators, barricades, or other channelizing devices).</p> <p>The work activity area provides a safe entrance and exit for work vehicles.</p> <p>The termination area provides an adequate distance for traffic to clear the work zone and return to normal travel lanes.</p>	

Item	Conditions	Rating
Inactive Work Site	<p>The site has been left in a functional condition that allows for the safe movement of all road users, including pedestrians, cyclists, and vehicles.</p> <p>Construction signs that are not being used are covered to prevent driver confusion.</p> <p>Signage and traffic control devices are appropriate.</p> <p>A specific person has been identified as being responsible for 24-hour maintenance and emergency response, and has accepted this responsibility.</p> <p>The traffic control layout is consistent with the Traffic Management Plan regarding inactive work sites.</p>	
Maintenance	<p>The road surface is free from gravel, mud, and other debris.</p> <p>Signage and traffic control devices are properly used, displayed, and set up, and are free from mud, debris, and obstruction.</p> <p>A specific person routinely monitors, inspects, and maintains traffic control signs and devices.</p>	

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Appendix E: Lane Closure Request Form

Appendix E contains a sample of the Ministry's Work Notification/Lane Closure Request and Approval Form (H1080).

The online form is available at <http://gww.th.gov.bc.ca/forms/getFormFile2.aspx?formId=649>.

It can be populated online, and then printed for submission to the Ministry.

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File Number _____
 Permit Number _____
 Date (yyyy/mm/dd) 20 / /

WORK NOTIFICATION/LANE CLOSURE REQUEST AND APPROVAL

NOTE: This form is to be submitted ten (10) working days prior to start of work or closure.

To _____ Telephone _____
District Manager Transportation District Office Fax _____

From _____ Telephone _____
(Organization) (Contact Person) Fax _____

- I request approval to **work** within the Ministry right-of-way (check as many boxes below as required):
 North Bound South Bound East Bound West Bound
- I request approval to **close** the Ministry right-of-way (indicate what will be closed by checking all applicable boxes below):
 North Bound South Bound East Bound West Bound
 Right Turn Lane Middle Lane Left Turn Lane Work on Shoulder Cyclists/Pedestrians
 Curb/Outside Lane Centre/Inside Lane All Lanes No Lane Closure Bridges/Intersections

on Highway _____ between _____ and _____
(Number) (Landmark) (Landmark)

from _____ a.m./ p.m. to _____ a.m./ p.m. on the following dates (yyyy/mm/dd) 20 / /
 to 20 / / ; for the purpose of constructing the following works: _____

In the above noted directions, the highway is one (1) / two (2) / three (3) or more lanes wide and
 zero (0) / one (1) / two (2) lanes of traffic will be maintained in the same directions as the closure.

PLEASE ATTACH THE FOLLOWING:

- a) Traffic control diagram figure number _____ as per "[Traffic Management Manual for Work on Roadways](#)";
- b) A detailed [Traffic Management Plan](#) (format available on the Traffic Management for Work on Roadways website).

APPROVAL SECTION

Request denied Request approved as submitted Request approved with the following changes:

- This approval is granted subject to traffic queues being monitored continuously by the Ministry or Project Representative while lane closures or traffic diversions are under way. Delays are not to exceed _____ minutes over the normal travel time.
- This approval is granted subject to traffic queues being monitored continuously by the Ministry or Project Representative while lane closures or traffic diversions are under way. Standards will be set as to what delays are acceptable to the public in the Traffic Management Plan and then work will commence until these standards are not met, at which time the Traffic Management Plan will be adjusted. Following acceptance of the revised Traffic Management Plan, the H1080 form is to be resubmitted for approval.

The Transportation Management Centre BC (TMCBC) 1-866-707-7862 must be contacted as follows:

- At the installation of the lane closure,
- Upon removal of the lane closure.

This approval must be kept on-hand at the work site.

Traffic Data Program can be accessed from [here](#)

District Manager Transportation (or Designate) Date (yyyy/mm/dd)

Once approved, if you have a DriveBC account, you can enter this data directly into DriveBC through the [DriveBC Input Tool \(DIT\)](#). Otherwise, please submit prior to 6:30 a.m. or 24 hours in advance to: [Ministry of Transportation and Infrastructure District Office](#), and cc the Transportation Management Centre BC (TMCBC) at TMCBC@gov.bc.ca. The TMCBC requires 24/7 emergency phone numbers for all projects.

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Appendix F: Tables A to D

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TABLE A – TAPER LENGTHS									
Taper Types (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Merge Taper Length	L _M	35	55	160	190	210	230	250	280
Lane Shift Taper Length	L _L	30	50	80	100	110	120	130	140
Downstream Taper Length	L _D	30	30	30	30	30	30	30	30
TCP, Signal, and Shoulder Taper Length (min. 5 devices)	L _S	5	8	15	15	15	15	15	15
Minimum Tangent Length between Tapers	L _T	30	60	160	190	210	230	250	280
Run-In Length on Centreline	L _R	40	50	60	60	70	80	90	100

Table A Notes	
Regular Posted Speed Limit	Device spacing and taper lengths should be to the regular posted speed limit.
L _M = Merge Taper Length	Merge length required to close lane on approach to work area. For speeds ≥ 70 km/h, merge length should be at least = $\frac{(\text{lane width of 3.7 m}) \times (\text{Posted Speed in km/h})}{1.6}$, rounded to nearest 10 m.
L _L = Lane Shift Taper Length	Used when a lateral shift is needed within the work area. Lane Shift Taper = $\frac{1}{2} \times L_M$, rounded up to nearest 10 m.
L _D = Downstream Taper Length	May be used in work zone termination area to provide a visual cue to drivers that they may return to the original lane or path that was closed.
L _S = TCP, Signal, and Shoulder Taper Length	<u>Shoulder Taper</u> : Used to close shoulders within activity area, or when shoulders might be mistaken for driving lanes. May be increased to $\frac{1}{3} \times L_M$ on higher-speed highways and freeways where shoulder width is ≥ 2.5 m. <u>Signal and TCP Tapers</u> : Used in advance of a work activity area where traffic is controlled so that the road is used alternately by traffic moving in each direction.

L_T = Minimum Tangent Length between Tapers	<p>Used between successive tapers or at other decision or conflict points to provide time for drivers to become accustomed to the first change and observe traffic control devices for the second change.</p> <p>$L_T = L_M$, but for high-speed/high-volume freeways and/or night work, it may be doubled ($2 \times L_T$) to increase time for drivers to become accustomed to the first change.</p>
L_R = Run-In Length on Centreline	<p>May be used on centrelines as minimum tangent length before development of lane departures or lane shifts.</p> <p>Run-in length = $0.8 \times$ speed (in km/h) (US Manual of Uniform Traffic Control Devices).</p>

TABLE B – DEVICE SPACING LENGTHS									
Device Spacing (m)		Regular Posted Speed Limit (km/h)							
		≤50	60	70	80	90	100	110	120
Construction Sign Spacing	A	40	60	80	100	150	150	200	200
Buffer Space	B	30	40	60	80	110	140	170	200
Roll-Ahead Buffer Distance	R	30	30	40	40	40	50	50	50
Channelizing Device Spacing for Tapers	C	10	10	15	15	15	15	15	15
Channelizing Device Spacing on Curves and Tangents	D	10	10	30	30	40	40	40	50

Table B Notes	
Regular Posted Speed Limit	Device spacing and taper lengths should be to the regular posted speed limit.
A = Construction Sign Spacing	<p>Recommended minimum spacing for signage. Spacing may be adjusted to accommodate site constraints and/or where high numbers of access points exist. Signs within the work zone should be spaced on the basis of the pre-construction, regulatory speed limit.</p> <p><u>Maximum Construction Sign Spacing:</u></p> <ul style="list-style-type: none"> • Spacing for the sign closest to the work activity area should remain as close as possible to Distance A. • For other construction signs in the advance warning area, spacing may be adjusted up to a maximum distance of 2 x Distance A. • Signs that include a distance measurement (e.g., Construction Ahead Next 2 km) should be placed in accordance with the distance cited on the sign or tab.

B = Buffer Space	<p>The longitudinal distance which provides a margin of safety for both the driver and the workers. It is important that the buffer space be free of equipment, workers, material and vehicles.</p> <p>A buffer vehicle with a crash attenuator may be located within the buffer space if there are space constraints.</p> <p>The buffer space is measured is from the end of the taper to the work activity area unless there is a buffer vehicle, in which case it is measured to the back of the buffer vehicle.</p> <p>Typically used on high-speed roadways but should be considered for all works where space allows.</p> <p>Distance is based on the braking distance on level ground for wet pavement as defined in the Transportation Association of Canada's Geometric Design Guide for Canadian Roads (1999).</p>
R = Roll-Ahead Buffer Distance	<p>The longitudinal distance measured from the front of the buffer vehicle to the work activity area. It provides a margin of safety in case of impact.</p> <p>Distance is based on the Minnesota Manual on Uniform Traffic Control Devices (2011).</p>
C = Channelizing Device Spacing for Tapers	<p>Maximum spacing between channelizing devices for tapers.</p>
D = Channelizing Device Spacing on Curves and Tangents	<p>Maximum spacing between channelizing devices on curves and tangents. Tighter spacing is acceptable especially on curves where device loss can impact directional continuity.</p> <p>Maximum device spacing is calculated as $0.4 \times \text{speed}$ (in km/h), rounded to the nearest 10 m.</p>

TABLE C – RISK EVALUATION FOR EMERGENT OR BRIEF-DURATION WORK												
Risk Evaluation Category	Risk Criteria	Criteria Met?										
1. Work Duration	Can the work be completed in 5 minutes or less?	Yes / No										
2. Sight Distance Distance from parked location to furthest point that can be seen on the road.	For the posted speed limit, is the minimum sight distance met? <table border="1"> <thead> <tr> <th>Speed Limit (km/h)</th> <th>50 - 70</th> <th>80 - 90</th> <th>100 - 110</th> <th>120</th> </tr> </thead> <tbody> <tr> <td>Minimum Sight Distance (m)</td> <td>100</td> <td>170</td> <td>250</td> <td>300</td> </tr> </tbody> </table>	Speed Limit (km/h)	50 - 70	80 - 90	100 - 110	120	Minimum Sight Distance (m)	100	170	250	300	Yes / No
Speed Limit (km/h)	50 - 70	80 - 90	100 - 110	120								
Minimum Sight Distance (m)	100	170	250	300								
3. Traffic Volume	Is the traffic volume in lanes that will be entered by workers estimated to be less than 5 vehicles per lane per minute?	Yes / No										
4. Environmental Conditions	Is visibility unrestricted (no fog, blowing snow, etc.) and are road conditions not slippery?	Yes / No										

Table C Notes
<p>A Risk Evaluation has three possible outcomes:</p> <ol style="list-style-type: none"> Answers to all risk criteria questions are Yes: Traffic control devices may be installed in accordance with the appropriate Emergent Work traffic control layout. Answers to one or two risk criteria questions are No: Traffic control devices may be installed in accordance with the appropriate Brief-Duration Work traffic control layout. Answers to three or more risk criteria questions are No: Additional traffic control measures are required beyond those described and illustrated for Emergent and Brief-Duration Work. The standard layout(s) for the appropriate short-duration, long-duration, or mobile work should be applied instead, which may necessitate calling in additional resources.

TABLE D – MINIMUM DISTANCES FOR MOBILE WORK						
Minimum Distance Moved (m) Every 30 Minutes	Regulatory Speed Limit (km/h)					
	≤50	60	70 - 80	90	100	≥ 110
	100	130	170	220	260	300

Table D Notes
<p>To be considered mobile work, the operation must move at least the distance shown in Table D for the posted speed limit every 30 minutes or less.</p> <p>If the work does not regularly move the specified distance, it should be treated as a stationary operation, and the appropriate layout should be used.</p>

Appendix G: Pilot Car Load Movement Guidelines

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Pilot Car Load Movement Guidelines

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Acknowledgements

In the development of these guidelines, we have relied on program information from a variety of other jurisdictions, and on content from the *Escort Drivers' Handbook (Rev Nov 29, 2011)*, produced by Alberta Transportation, and the *Pilot Car Escort Best Practices Guidelines* which was produced jointly by the Specialized Carriers & Rigging Association, the US Department of Transportation Federal Highway Administration and the Commercial Vehicle Safety Alliance.

We have appreciated opportunities to speak and work with the [*Evergreen Safety Council*](#), who provide pilot car driver training and other road safety services in Washington State. They graciously allowed us to make use of some of their materials in our early stakeholder consultations, and we thank them.

We are especially grateful for input received from the pilot car and trucking industries in the Province of British Columbia and other parts of Western Canada; your points of view and experience are very much appreciated.

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Section 1: Introduction

1.1 Purpose of the Guidelines

Pilot cars play an important role in making sure that unusually large loads or wide vehicles travel BC's roads safely. Pilot cars function to warn other road users of the presence of an oversize vehicle, assist in maneuvering the load through constrained areas, and keeping traffic delays to a minimum.

These guidelines have been developed to support activities for the safe movement of oversize loads over BC highways. The standards for pilot cars and their equipment are set out in the [BC Commercial Transport Regulations Division 8](#). This manual is intended to clarify, enhance and support the conditions for travel that are set out in provincial permits for oversize and overweight loads.

The traffic control described and illustrated in these guidelines is generally the minimum required. No one standard sequence of signs or other control devices can be set up as an inflexible arrangement for all conditions and locations, due to the variety of conditions encountered. It should also be recognized that while the Pilot Car Load Movement Guidelines contain mandatory language such as "shall" there may be circumstances where strict compliance with such requirements is not reasonable and it will be necessary to deviate from the requirements.

Loads that are very large or very heavy often require the development of detailed, written Transportation Management Plans in the course of planning and seeking approval for the necessary permit to move the load. In those cases, in addition to the content of these guidelines and the legal requirements from the BC Commercial Transport Regulations, please consult the guidance in [Section 6.4.4 Chapter 6, of the Commercial Transport Procedures Manual](#).

1.2 Definitions

Lead pilot car:	A pilot car travelling ahead of the load. Where there are two pilot cars ahead of the load, the lead pilot car is the one closest to the load. The lead pilot vehicle should travel 4 to 8 seconds ahead of the load. The purpose of the lead pilot car is to warn oncoming drivers that the load is approaching and to double check clearances and other constraints for the load.
MoT:	BC Ministry of Transportation and Infrastructure
Multilane highway:	A highway with at least 4 lanes (typically 2 lanes in each direction).
Oversize load:	The vehicles and loads that are overheight, overwidth, overlength and/or overweight, i.e. any load or vehicle for which the terms of a permit or authorization requires the use of one or more pilot cars.
Pilot car:	A pilot car, for the purposes of these guidelines, is a vehicle that is escorting commercial transport vehicles. A pilot car used to escort commercial transport vehicles is different than a pilot car used to lead traffic through a work zone.

Rear pilot car:	The rear pilot should travel 4 to 8 seconds behind the load. The purpose of the rear pilot car is to warn drivers approaching from the rear, to monitor the load (e.g. cargo securement, off tracking, etc.), and to notify the load driver if any vehicles may be passing. The rear Pilot Car should avoid getting in the load driver's blind spot without communicating with the driver.
Scout pilot car:	When there are two pilot cars travelling ahead of the load, the scout pilot car travels further ahead in order to identify potential issues before the front pilot car and load arrive. The scout pilot car is also responsible for establishing appropriate traffic control, if required.
Traffic control:	The act of slowing, stopping, or directing general purpose traffic on a highway (flagging). All traffic control must be conducted by a certified traffic control person as per the Occupational Health and Safety Regulation, Division 18. When a Pilot Car is only operating as a mobile warning device for the load, it is not conducting traffic control.
Trailing pilot car	When there are two pilot cars travelling behind the load, the pilot car furthest away from the load is the trailing pilot car. The trailing pilot car position is typically a temporary position that a second or third pilot car may occupy following a traffic control situation where traffic was held in order to let the load manoeuvre.
Transportation Management Plan	A transportation management plan is used to plan and implement moves for loads that are very large or very heavy. They detail the specific agreed processes for the movement of the load. This is different from a "traffic management plan" which is used to outline vehicle movement through a construction zone.
Two and three lane highway:	A highway with one lane in each direction but may have sections with passing or truck climbing lanes resulting in a total of three lanes.

1.3 The Importance of Pilot Cars

Provincial highways are designed to fit standard vehicles with standard dimensions. However, there are times when the movement of oversize loads are required to meet the needs of both public and industry.

Oversize load vehicles and the loads they carry are often too long, wide, or high for the marked lanes of a highway or the infrastructure on and over the highway. This can create operational problems, especially as many of British Columbia's highways are two-lane, two-way highways.

Pilot cars ensure that all road users are aware of the potential hazard, and know what to do if they encounter these vehicles so they can pass safely.

Section 2: General Pilot Car Operations

2.1 When Pilot Cars are Required

Pilot Car requirements for oversize load moves on provincial highways will be established by the terms of the permit issued for the move. These permits also establish other terms for the move, including time of day movement restrictions.

One or two pilot cars may be required when the load width, length, or height result in needing additional roadway space to maneuver. Basic rules for whether one pilot car should be in front of or behind the load are set out in the Commercial Transport Regulations, section 8.08. When two pilot cars are used, generally one is positioned as lead and the other follows the load as the rear pilot car. The main duties of the rear pilot car driver are to communicate with the load driver about surrounding traffic or other obstacles, and to monitor the load.

Three or more pilot cars may be required for more complex moves. The requirements and typical positioning of the pilot cars would be set out in the permit conditions and may vary depending on the locations and situations along the route. A third pilot car would typically assume the scout pilot car position and may travel well ahead of the load and lead pilot car in order to identify appropriate traffic control locations or pinch points ahead of time.

[CVSE 1000](#) and other T-forms set out the general pilot car requirements. The load permit may have additional requirements. If a transportation management plan has been required as a condition of approval for the move, it may have further pilot car and traffic control requirements.

Figure 2.1 – Sample of permit pilot car requirements

Pilot Cars:

Pilot cars must have two-way communication with the driver of the oversize load.

Length	Width →	Up to 3.2 m		3.21 to 3.5 m		3.51 to 3.8 m		3.81 to 4.4 m	
		Day	Dark	Day	Dark	Day	Dark	Day	Dark
Up to 27.5 m		0	0	1*	1	1	1	1***	2
27.5 to 31 m		1	1	1	1	1	1	2	2
31.1 to 36 m		1	2	1	2	1	2	2	2
36 to 40 m		2**	2	2**	2	2	2	2	2

* Or the towing vehicle must be equipped with and operate one or two amber flashing lights

** Up to 3.5 m wide, only one pilot car is required for travel over four (4) lane highways

*** Two pilot cars for travel on Highway 97 from the junction of 77/97 to the Yukon Border

For weight permits, where the approval to obtain a permit includes bridge crossing conditions, a minimum of two pilot cars are required at each bridge crossing condition location

Additional Pilot Car Requirements for Front or Rear Projection:

- If you are using an allowance for front projection beyond 3 m of the kingpin or beyond 6.5 m measured forward of the turn center of the front steering axle group, a minimum of one pilot car is required (unless otherwise provided for by commodity or vehicle policy).
- If you are using an allowance for rear projection beyond 6.5 m from the turn center if the rear-most axle group, a minimum of one pilot car is required (unless otherwise provided for by commodity or vehicle policy).
- A minimum of two pilot cars will be required if the load exceeds 3.8 m in width and the front projection is in excess of 3 m and/or the rear projection is in excess of 6.5 m.

For overall widths over 3.2 m, a minimum of one pilot car is required:

On Vancouver Island:

- Highway #4 from the Taylor River Bridge (40 km west of Port Alberni) to Tofino
- Highway 30 from Highway 19 to Port Alice

On the Sunshine Coast: Highway 101 from Langdale to Earl's Cove

In the Lower Mainland/Southern Interior: Highway 99 from Pemberton to Lillooet

In the Kootenays:

- Hwy 3A and 31 (Balfour-Kaslo-Galena Bay Highway)
- Hwy 33, southbound only, to approach and cross the Westbridge Bridge

In the Peace River Region: Highway 97 from Junction 77/97 to the Yukon border

2.2 When Certification is Required

In BC, pilot car operators are not required to be certified to do the parts of their work that do not involve controlling traffic, such as acting as a moving visual warning device escorting a commercial load, and communicating with the load driver to assist in the safe movement of the load.

However, certification is required to perform traffic control in a high risk situation, such as on a highway. In BC, the basic level of certified traffic control training is available through the [BC Construction Safety Alliance](#), and the Occupational Health and Safety Regulation further requires that employers must provide additional training if the traffic control needed is more advanced than what is covered in the basic course. The basic course teaches the current standards for traffic control, primarily intended for flagging at road construction sites, and also covering information about equipment, flagging movements, stopping distances, etc. These guidelines establish the movement of commercial loads using pilot car escorts and standards for advanced traffic control training related to the movement of commercial loads.

Further, oversize and overweight permits in BC require that traffic control, where necessary, must be done by a certified traffic control person using the methods set out in these guidelines, or by a peace officer.

Out-of-province pilot car operators who engage in traffic control in British Columbia shall either be certified traffic control persons in British Columbia or proof of valid traffic control person certification from their home jurisdiction.

2.3 Related Laws and Policies

Pilot car use is one piece of the overall permitting process for oversize and overweight loads. Some other tools are:

- Standards for weights and dimensions of vehicles and loads without permits on provincial highways are in the BC Commercial Transport Regulations, [Division 7](#).
- Legal requirements for pilot cars and their equipment are in the BC Commercial Transport Regulations, [Division 8](#).
- The [Commercial Transport Procedures Manual](#) which sets out policy guidelines for permitting
- [T-Forms](#) (permit attachment forms) which are attached to permits to provide travel times, numbers of pilot cars required, basic light and flag information, and sometimes routing assistance
- [Extraordinary Load Approvals](#) and [CVSE1052](#) forms for extremely large or heavy loads
- In BC, permits are issued through the Provincial Permit Centre, 1-800-559-9688, and online at [OnRouteBC](#). Permit Centre hours are 6 am to 10 pm, 7 days per week, except Christmas Day.

2.4 Best Practices

Pilot car operators need sufficient driving experience and training that they can manage the complexities of assisting the load they are escorting in addition to the usual demands of operating a motor vehicle. Keep in mind that pilot car operators must:

- Comply in all respects with provincial or other government laws for the movement of vehicles.
- Drive defensively – anticipate potential incidents and plan for them. Expand the area you would be aware of when operating your personal vehicle to the area the load driver needs to be aware of.
- Be aware of the load driver's lines of sight.
- Keep windows uncluttered, and mirrors properly adjusted.
- Respect the weather and the road conditions, and drive accordingly. Remember that, in some cases, permits become invalid when road conditions are poor.

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Section 3: Load Movement Planning

3.1 Non-provincial Highways

The use of non-provincial highways such as municipal streets and industrial roads is subject to approval and/or permitting by the jurisdiction operating those roadways, and operational requirements may differ. Sometimes those jurisdictions place controls (such as noise bylaws) that affect oversize load moves, and must be planned for in advance.

3.2 Route Planning or Route Survey Guidelines

Single trip oversize or overweight permits for loads that require the use of pilot cars include approved routing information. The approved route must be followed exactly, unless a peace officer directs otherwise.

When using a term permit (which does not have a specified route), or if assisting a carrier to plan a route before a single trip or term permit is obtained, consider the following:

- What are the load dimensions? Are there areas along the route which will require special attention?
- Known constraints on the highway, and how to manage the traffic. For example, if oncoming vehicles will have to be stopped to allow the oversize load to pass, plan a suitable place for directing road users at constraint points along the route. Very large loads may need approval of a Transportation Management Plan by MoT, RCMP and utility companies before a permit can be issued, and these moves often involve making arrangements ahead of time to temporarily move infrastructure such as signs and barriers. Guidelines for developing Transportation Management Plans can be found in [Section 6.4.4 Chapter 6](#) of the Commercial Transport Procedures Manual.
- Where are the pullouts and other stopping points along the route?

The MoT maintains an overheight registry of major structures located along the numbered highways in BC, available at www.DriveBC.ca. Carriers and/or pilot car operators should use this tool during pre-trip planning to determine the route to request for the permit. Clearances should be checked for each and every trip.

3.2.1 Using Height Poles on Route Surveys

From time to time, a pilot car with a height pole may be engaged to double-check route viability during the planning stage for an oversized move. Before embarking on such a trip, height clearances on major routes should be checked using the CV Height Clearance Tool at www.DriveBC.ca. If the pilot car operator engaged to do route analysis does not have strong local knowledge, they must check with local weigh scale staff before running the route, to identify known issues that might prevent the trip.

Power and other overhead lines and bridge structures may have lower road clearance tolerances on secondary highways and municipal roads, and care must be taken at all times, including during route analysis, to maintain a safe clearance distance from the lines. See [Section 4.2.1](#) for height pole requirements.

If a visual estimate indicates that the height pole may come in contact with a line, stop in a safe location and assess the situation. Use a safe tool to measure overhead wires and lines or traffic signals - preferably a laser or other electronic measuring device. If using a measuring stick, it must be of a non-conductive material, and must not make direct contact or come too close to the line or signal; measure to the side. Any measurement activities that might interfere with the flow of traffic must be done with appropriate approvals, using certified traffic control personnel.

www.DriveBC.ca is a good resource for planned construction activity on the selected route. It can also be helpful to use web tools such as maps that have street view to assist in determining the shape of a structure you will be encountering.

Note: Legal height in BC is 4.15 m, measured from the surface of the roadway. In order to exceed 4.15 m with a height pole, except while escorting a permitted load, an oversize permit is required (Provincial Permit Centre – onRouteBC.gov.bc.ca 1-800-559-9688)

In order to exceed 4.88 m overall height (5.33 m in the Peace River Area), an [Extraordinary Load Approval](#) and a signed [CVSE1052](#) form are required before the permit can be obtained. Please allow a few days to obtain these documents.

3.3 Expect the Unexpected (Contingency Plan)

Develop and review contingency plans with the pilot cars involved with the move, the load carrier and their oversize load driver

- Plan for vehicle breakdowns
- Plan for emergencies, including allowing emergency vehicle to pass
- Plan for sudden weather changes
- Plan for contact with an overhead obstruction
- Plan for railroad crossing issues – See [Section 8.5](#) and [Operation Lifesaver Tips for Professional Drivers](#)
- Plan for vehicle collisions/accidents and property damage
- Plan for allowing scheduled vehicles to pass (Bus Lines, Mail Services, etc.)
- Cell coverage maps from cell providers should be checked to determine where cell coverage areas may be lost
- Plan for bringing in additional or replacement Pilot Cars
- If the pilot car operators are not certified for traffic control, plan for how certified traffic control persons will be brought in if an unexpected circumstance will require traffic control.

3.4 Pre-trip Meetings

A safe move requires good teamwork. Before beginning an oversize load move, make sure all contacts required for the move are clearly identified with contact information. Discuss and plan the move with the load driver and any other pilot car operators or teams involved.

Prior to the start of an oversize load move, a team coordination meeting should take place. Meetings should be held on the initial move day, and on subsequent days if the move takes place over several days.

- Discuss roles and responsibilities of the move's team members
- Discuss safety precautions and communications to be used during the move and ensure all team members have two-way radio and cell phone communication for the move (see [Section 4.4 – 4.7](#))
- Verify the oversize load dimensions against the permit before leaving
- Review the route plan and verify the route hazards expected to be encountered that day (bridge and overpass clearances, signs, wires, concrete barrier and shoulder issues)
- Check the permit and any attached approval for bridge crossing or other locations that have mandatory traffic control, and ensure that those locations are known and understood
- Discuss and complete a Job Hazard Safety Analysis

A Job Hazard Safety Analysis is part of the team coordination meeting and consists of the following steps:

- Identify load-specific risks
 - Fire
 - Explosive potential
 - Dangerous goods (identify railroad or tunnel restrictions based on the material to be moved)
 - Load configuration (protruding components, weight/load shift potential)
 - Fragile or collapsible loads
 - Time sensitive or perishable materials
- Ensure appropriate emergency equipment is on hand and team members know how to use it
- Review emergency procedures
 - Review procedures for communications during emergencies
 - Review procedures to delay or abort the move
- Review load dimensions and the subsequent limitations
 - Ground clearances
 - Load Height
 - Maneuverability limitations
- Review contingency plans for emergencies
 - Contact information to emergency providers along the route
 - Stopping sites for reviewing load security and breakdowns

3.5 Checks just prior to Moving the Oversize Load

- Check the pilot cars to ensure they are equipped with the proper signage, communication, and safety equipment for the move.
- Test communication equipment prior to the load proceeding.
- Verify the dimensions of the load and vehicles involved in the move to ensure load and vehicle fit within the clearances of the expected structures and roadside geography expected along the route.
- Identify any features of load security that pilot car operators might help monitor, if needed.
- Verify all permits are available to be shown to officials where required.
- Verify the permit restrictions, including the times the move may take place.
- Verify the route outlined on the permit matches the planned route.
- Review how each vehicle in the move will be positioned for the move.
- Identify the location where the next safe stop will be made, if required.

Section 4: Equipment and Communication

4.1 The Pilot Car

Vehicle requirements and the specifics of signs and lights required on the pilot car may be found in [Division 8](#) of the Commercial Transport Regulations.

We recommend choosing a vehicle, such as a light pickup or SUV, that:

- has good stability at highway speed with a sign displayed;
- allows the sign to be clearly visible in heavy traffic;
- offers sufficient cargo capacity for required equipment, signs and devices.

4.2 Pilot Car and Driver Equipment to be Worn/Carried

As a minimum, you must wear and carry/use the following:

- Safety apparel as per [BC MoT Technical Circular T-09/05](#)
- Required signs and devices, as described in section 4.3
- Radios and cell phones, as described in section 4.5

Recommended additional equipment:

- First aid kit
- Fire extinguisher
- Tape measure or other measuring equipment (minimum 8 m/25')
- Personal items: Drinking water, food, extra clothing, blanket, medication
- General tool kit with pliers, wrenches, screwdrivers, etc.
- Jumper cables
- Motor oil, coolant, windshield fluid, etc.
- Extra "Oversize Load" and "Wide Load" or "D" sign, meeting the requirements from [Section 8.03 of the Commercial Transport Regulations](#), with hardware for attaching it to a load

4.2.1 Height Pole

Height poles, if used, must be made of non-conductive material such as fiberglass or plastic, and equipped with a flexible tip. The height pole should be set at 100 to 150 mm above the height of the load to accommodate flexing in the pole caused by wind resistance when travelling. The intent is not to strike power lines or overpasses, as height on the route should always be known in advance of the move. The height pole is intended to be an extra safety measure in case of unexpected clearance issues on the route.

Scout and/or lead pilot cars may be equipped with height poles, under oversize permits, and preference would be given to the scout car to accommodate stopping distance for the load. If using a height pole on a lead pilot car, and a potential height obstacle is observed ahead, the lead pilot car and the load should develop a large enough gap to allow the load to stop if necessary.

If height pole(s) are used on scout and/or lead pilot cars while escorting overheight loads travelling under a single trip permit, no additional oversize permit is required for the pilot car(s) during the permitted trip.

4.3 Signs and Devices for Traffic Control

When traffic control is needed for 15 minutes or more, additional devices will be needed for traffic control outside a vehicle. For example, sometimes unforeseen circumstances, such as a breakdown, can result in lengthy unplanned traffic control. Information on the following signs and devices can be found in [Chapter 4 and Appendix B of the TMM](#).

With each oversize load move requiring pilot cars, at least the following signs and devices must be carried:

- One (1) Stop/slow C-027 paddle per crew member - (Illuminated traffic stop paddles, with LEDs around the perimeter of the sign, are an acceptable enhancement for stop/slow C-027 paddle as per [WorkSafeBC Occupational Health and Safety Regulation Guidelines Part 18, Section 9a](#))
- One (1) illuminated baton with light that appears red or flashlight fitted with a red signalling wand, per crew member
- Two (2) Road Work Ahead C-018-3A signs, in fluorescent pink or fluorescent orange, with necessary supports
- At least five (5) channelizing devices (tubular markers, barrels, or cones), to form tapers

This equipment may be distributed among all the pilot cars involved in the move.

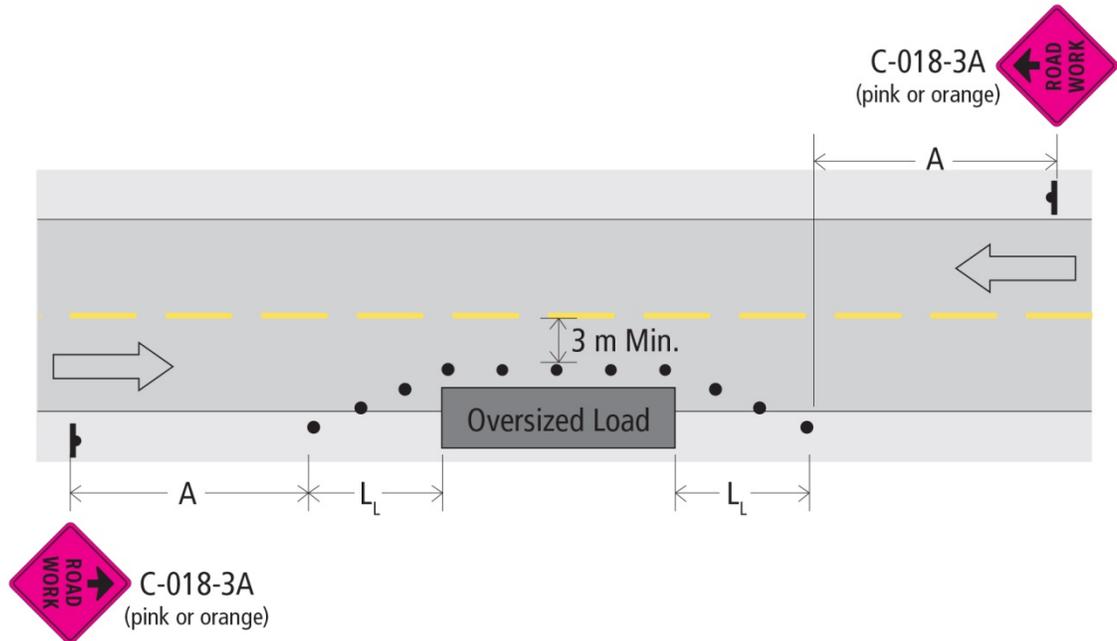
Note: The above signs and devices are mandatory for all oversize/overweight load moves requiring pilot cars, even if the pilot car operators are not certified traffic control people, in case of an emergency situation.

Pilot car crews should also carry the following additional equipment, especially crews escorting very large or very heavy loads.

- Two (2) Traffic Control Person Ahead C-001-1 signs
- Two (2) Prepare to Stop C-029 signs
- Temporary sign support for each sign
- Five (5) additional channelizing devices to form tapers

Pilot car operators should be prepared to set up simple layouts such as that shown in [Figure 4.1](#) for situations such as vehicle breakdowns or unexpected stops. If the anticipated incident duration is greater than 15 minutes, or if a complete lane closure is required, certified traffic control people must be brought on scene and additional signage and devices may be required.

Figure 4.1 – Emergency or Incident – Load Pulled Over but Partially Encroaching into Travelled Lane



Refer to Table A and Table B in [Section 6.6 of the Traffic Management Manual for Work on Roadways](#) for spacing A and L_L .

4.3.1 Vehicle-mounted Stop Signs (Optional)

A pilot car may be equipped with a vehicle-mounted stop sign, mounted approximately midway down the vehicle, on the driver's side, at such height that it is visible to approaching vehicles and does not block the pilot car driver's mirrors or their view from the mirrors. The vehicle-mounted stop sign must swing out and in under the control of the driver, and must be covered at all times except when escorting an oversized load. The appropriate sign for this use is a double-sided, 600 x 600 mm, R-001 stop sign.

Illumination, such as LED lights around the perimeter of the sign, is acceptable. Red or amber alternately flashing lamps, such as those used on school buses, are prohibited on vehicle-mounted stop signs for pilot cars.

See [Section 5](#) for guidance about when a vehicle-mounted stop sign may be used in traffic control.

4.3.2 Dynamic Message Signs (Optional)

In addition to the pilot car sign mandated in Division 8 of the Commercial Transport Regulations (e.g. Wide Load, Oversize Load, D), dynamic message signs (DMS) may be used to direct traffic and provide additional messaging. DMS may display traffic control message such as STOP, SLOW, DO NOT PASS or OBEY FLAGGER.

When used at night, a DMS shall adjust brightness levels to maintain legibility and visibility for oncoming vehicles.

DMS should use primarily yellow text. Other text colours may be permissible, e.g. STOP messaging in red text, but its use should be limited. For nighttime visibility, coloured text on a black background is preferred.

Figure 4.2 Dynamic Message Sign



4.4 Communication during the Move

One of the pilot car operator's most important roles is to monitor the area around the load and communicate what they see to the oversize load driver. Pilot cars in front of the load are especially helpful for communicating about obstacles ahead, and those to the rear are very helpful for keeping the load driver informed about vehicles that may be approaching to pass, and also identifying cargo securement or load security issues.

Remember that the load driver needs to know where you are. Watch lines of sight or communicate when moving out of sight.

We suggest using "call signs" for communication during the move. They don't have to be fancy or formal, but agreeing ahead of time on how you will address each other may be helpful, especially when other oversize loads are in the area.

Test the frequencies or channels that were specified in your pre-trip meeting and other trip planning, and make plans for what to do if radio communication is temporarily not available.

4.5 Radio Equipment and Frequencies

Radios to be used should either be 40 channel CB (GRS) radios or 128 channel (minimum) VHF radios. If possible, carry a spare radio and extra batteries. Try to avoid chatter, and politely ask other traffic to do the same, if necessary. Carry information about available frequencies for the area and route you will travel, including where international travel applies.

Cell phones are useful as a backup, either via Bluetooth or at roadside.

If the users will be operating on resource roads then they must use VHF radios so that they can communicate with other vehicles on the roads and report their locations. VHF radios are required on resource roads, and for use of LADD channels, and operators need a license from [Innovation, Science, and Economic Development Canada](#) (ISED). Information about application for that license can be found on their website.

VHF radio operators require an appropriate license to operate in Canada. CB radio operators do not require a license in Canada or the US. However, they must ensure that their radio equipment is legal in Canada (it should have an ISED approval sticker), and they must operate in it a legal manner (no profanity, no transmitting of sensitive material, etc.)

4.5.1 Radio Channels for VHF Radios

For information about available radio channels, please contact the Spectrum Management and Telecommunication branch of ISED. A listing of local offices and contact information may be found at [their website](#).

A trucking firm may have its own radio frequencies, licenced to them by ISED. In that case, it would always make sense to use the frequency licenced to the trucking firm instead of the LADD channels, which can be fairly congested and open to everyone, except for communications intended for traffic around the load. Many pilot cars are equipped with and use two VHF radios for this reason.

It is also possible to use another company's assigned frequency only if:

- The frequency is valid in the area they will be using it.
- They have a letter from the company authorizing their use of the frequency.
- They have updated their ISED licence to include the authorized frequency.

4.6 Best practices for speaking into a two-way radio

Radios are used to improve safety. It's important that the messages you transmit are clearly heard and understood.

- If possible, hold the microphone directly in front of your mouth, just 1 to 2 inches away. This helps minimize surrounding noises.
- Speak directly into the microphone, rather than across it. Radios are designed to be spoken directly into.
- As much as possible, shield the microphone from surrounding noises.
- Position radios and microphones away from car radios or other noisy equipment.
- Speak clearly and at a normal pace; neither too fast nor too slow. And if someone on the other end is hard to understand, don't be afraid to say so.
- In congested areas with lots of traffic, it's especially important to use proper radio calling procedures, meaning use previously established call signs.

4.7 Radio use on resource roads

When radio use is required for travel on resource roads, [these guidelines](#) from the BC Ministry of Forests, Lands and Natural Resource Operations should be followed.

It is very important that users have an accurate map of the resource road channel assignments for the resource roads they will be travelling on. There is [channel assignment information](#) on the Innovation, Science, and Economic Development Canada website.

Section 5: Traffic Control (Flagging) Practices

Pilot car operators are often required to conduct traffic control (flagging) as part of an oversize load move. Any pilot car operator that is conducting flagging must be a certified traffic control person. In each situation, a pilot car operator will have to decide if it is best to flag from within their vehicle or outside their vehicle.

Illuminated traffic stop paddles, with LEDs around the perimeter of the sign, are an acceptable enhancement as per [Work Safe Occupational Health and Safety Regulation Guidelines Part 18, Section 9a](#).

5.1 Flagging from Inside a Pilot Car

The following are conditions where it may be appropriate to control traffic from within a pilot car. These are straightforward, simple and brief situations. An example of a simple flagging situation where traffic control may be conducted from within a vehicle would be a short closure at a two-lane bridge or tunnel where the load needs to straddle the centreline in order to pass.

- Daylight hours only
- Short duration (15 minutes or less)
- Good sight distances for approaching vehicles in both directions
- Work on a two-lane highway
- No adjacent or nearby intersections or accesses
- Low traffic volumes
- Traffic control only needs to direct to stop or proceed

Flagging from inside a Pilot Car requires the following equipment:

- Retro-reflective hand held stop/slow C-027 paddle
- *Optional instead of hand held stop/slow sign:* Vehicle-mounted stop R-001 sign as per [Section 4.2.1](#)
- The appropriate Class 2 safety apparel as per [Section 5 of the Traffic Management Manual for Work on Roadways](#)

Pilot cars which use a dynamic message sign may control traffic from inside the pilot car at night, under the above circumstances.

5.2 Flagging Outside a Pilot Car

When conducting traffic control from outside a vehicle, refer to the [Section 5 of the Traffic Management Manual for Work on Roadways](#) for information on positioning, signals, and safety requirements. Remember to always have an escape route and be aware of your surroundings.

Except for situations described in [Section 5.1](#), traffic control should be performed from outside the pilot car. This includes:

- Longer duration
- Sight distance limitations
- Multi-lane highways
- Near intersections, or there are intersections/accesses within the area that is being closed
- Higher traffic volumes
- Where traffic may need to be guided or directed to perform an action other than stopping.

Flagging from outside a Pilot Car requires the following equipment:

- Retro-reflective stop/slow C-027 paddle, hand-held or pole mounted
- Illuminated baton with light that appears red or flashlight fitted with a red signalling wand
- The appropriate Class 3 safety apparel as per [Section 5 of the Traffic Management Manual for Work on Roadways](#)
- Two-way radios to maintain communication with the load and other pilot vehicles.

In all cases, a TCP must consider their visibility when choosing a location from which to stop traffic. It is important to remember that the distance required for an approaching vehicle to stop increases with approach speed, on wet roads, or on downgrades. Drivers need enough space to see the TCP, react to their sign, and come to a stop. [Table 5.1 – Stopping Sight Distance](#) can be used as a guide and provides a summary of stopping sight distance for passenger vehicles on a flat, wet roadway.

Table 5.1 – Stopping Sight Distance

Speed (km/h)	Stopping Sight Distance (m)
60	85
70	110
80	140
90	170
100	210
110	250
120	290

When standing near the pilot vehicle, the headlights and other accessory lights can draw attention away from the TCP and obscure their visibility. The pilot vehicle should be oriented so that it is not shining lights directly behind the TCP (when viewed by approaching vehicles). This arrangement can make it difficult for approaching drivers to see the TCP over the headlight glare. In this situation, the headlights on the pilot vehicle should be switched to parking lights so that the vehicle itself is still visible, but does not drown out the TCP.

Note: It is important to use your judgment as terrain or circumstances may require additional measures. If you are standing outside your vehicle flagging for less than 15 minutes, you don't always need signs and other devices. However, planning an escape route, being prepared to use it, and positioning yourself where you can see and be seen is extremely important. See [Section 4.3](#) for more on signs and devices for traffic control.

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Section 6: Pilot Car Load Movement - General

6.1 Pilot Car Operation for Different Load Characteristics

Each oversize load is different. It may be overwidth, overheight, overlength, and/or overweight, and those characteristics help to establish what the pilot car operator needs to watch for and be aware of during the move.

Note: If it is necessary to take actions that will affect the movement of other traffic around the load, those actions must be taken by a certified traffic control person or peace officer.

6.1.1 Overwidth Loads

In addition to being a moving warning device to let other drivers know that something big may be coming into their lane, pilot car operators should watch for areas where the road narrows, shoulder signs or rock outcroppings that may be risks to the load, spots where tunnel or bridge edges will require extra caution, curbs or concrete barriers that may require ground clearance, etc. Also, keep the load driver informed about obstacles such as cyclists or stopped vehicles ahead on the road shoulder.

For a lead pilot car, it may help to position your vehicle close to the centre line.

6.1.2 Overheight Loads

The physical height of an overheight load must match or be lower than the height indicated in the permit. Watch for bridges, overpasses and other obstacles that should be communicated to the load driver.

Power lines frequently cross highways, and only professionals with the utility companies, or their contractors, can handle their lines. [Part 19 of the Occupational Health and Safety Regulation](#) is a good source of information about maintaining a safe distance from lines.

See the Trip Planning section for more information about checking height clearance limits on your route in advance, and the Common Constriction Points section for more information about travelling through overhead obstacles.

6.1.3 Overlength Loads

Curves and turns onto and off of roadways are key for overlength loads. The load driver may need to swing very wide in order to complete a turn without the middle part of the load posing a danger to the inside corner and any pedestrians, cyclists or road infrastructure located there. When negotiating tight curves to the left, the middle part of the load may encroach into the next lane. In either direction, the tail swing may need careful control.

It may take extra time for the load to clear an intersection or rail crossing. Also, if a long vehicle combination has low ground clearance, be aware of and careful at rail crossings, since the load must clear the rails.

6.1.4 Overweight Loads

Many permits for overweight loads have specific conditions for crossing bridges along the route. It's important to know the locations of the bridges in advance, together with the exact conditions for the crossing. Common conditions include:

- Travel down the centre line, or straddling two lanes
- Maximum speed of 10 km/h
- Must be the only vehicle on the bridge while crossing

The permit documents will tell you which conditions apply at each bridge. Often bridge crossing conditions make it necessary to hold traffic while the load crosses. See [Section 8: Pilot Car Load Movement Layouts - Structures](#) for further guidance.

Term weight permits have a permit attachment ([Form CVSE1011](#)) that lists bridges with weight restrictions on major provincial roads.

6.2 Positioning on the Highway

Basic Pilot Car positioning is set out in the Commercial Transport Regulation, Division 8 or for more complex situations, in the permit and accompanying documents. When road conditions dictate that the use of the pilot car in another position (or at a greater distance) would be more effective, the pilot car position may be temporarily reassigned. For example: A pilot car is assigned to the rear of an overlength load on a two-lane highway. The load is about to enter a highway segment that has curves significant enough to cause the load to encroach on the oncoming lane of traffic. The pilot car may be temporarily reassigned to the front to warn oncoming traffic.

When escorting a load, the Pilot Car shall have its sign displayed, headlights on and amber flashing lights on.

6.3 Passing a Slower Vehicle

Although it is rare for an oversize load to overtake a slower moving vehicle, it may occur. Be cautious and aware of how much time you will need to spend in the passing lane. A decision to pass will be made by the load driver, and the pilot cars will keep the load driver informed of their movements and movements by other traffic in the area.

If there is a lead pilot car, one of its roles is to inform the other vehicles about oncoming traffic, in case they need to move to the right for safety. Remember that the rear pilot car's forward vision will be blocked by the load. They are relying on communication from the forward-most vehicle to tell them if they need to merge back into the right lane.

If there is a rear pilot car, its role is to move left just before the load moves left, blocking other vehicles from passing and informing the load driver when they are in position. As soon as it passes the slower vehicle, the rear pilot car driver notifies the load driver by radio that it is safe to move right, and then follows the load back into position in the right lane.

Figure 6.1A Initiating a passing manoeuvre – rear pilot car moves left

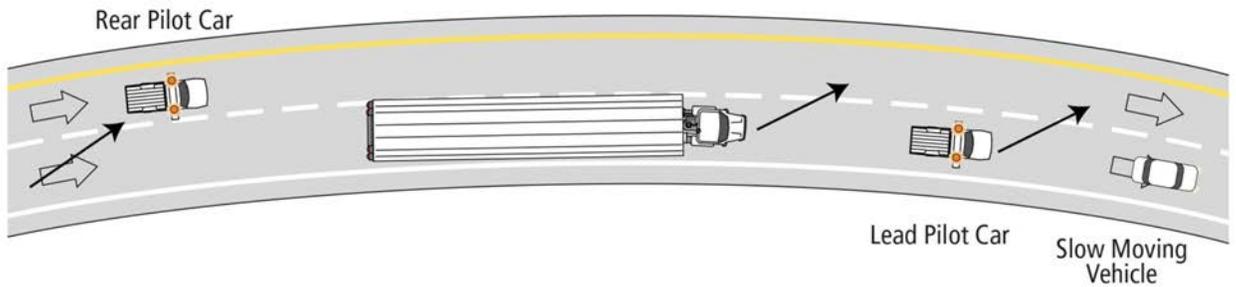


Figure 6.1B Truck moves left once the rear pilot car is in position

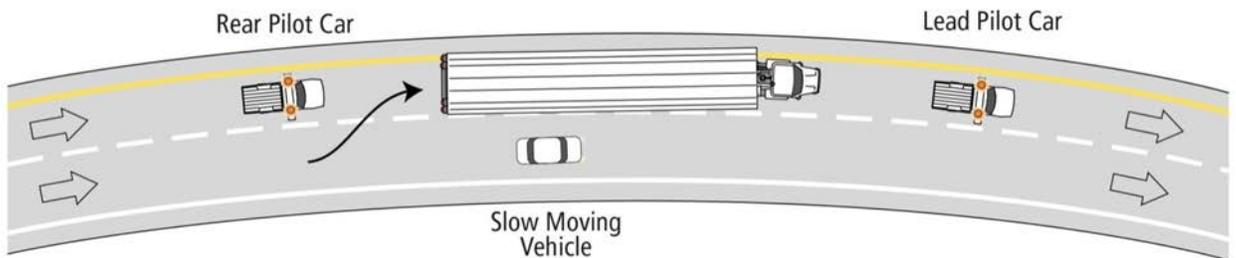
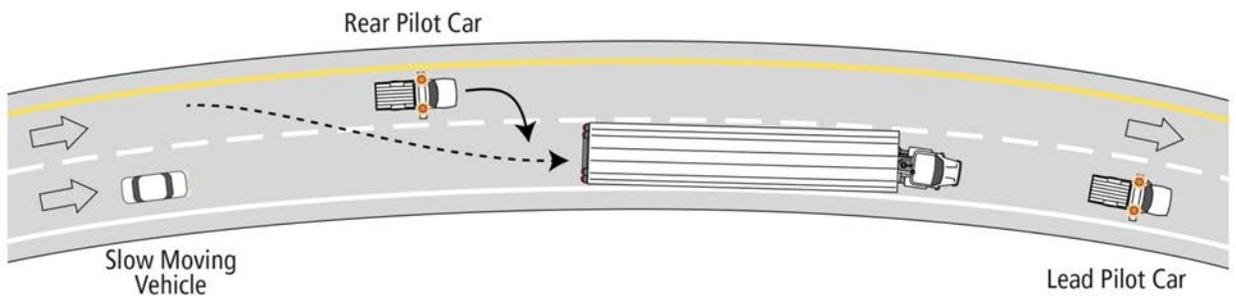


Figure 6.1C Rear pilot car notifies the load driver that the slow vehicle is now passed, and the load and rear pilot car move right



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Section 7: Pilot Car Load Movement Layouts – Roadway Type

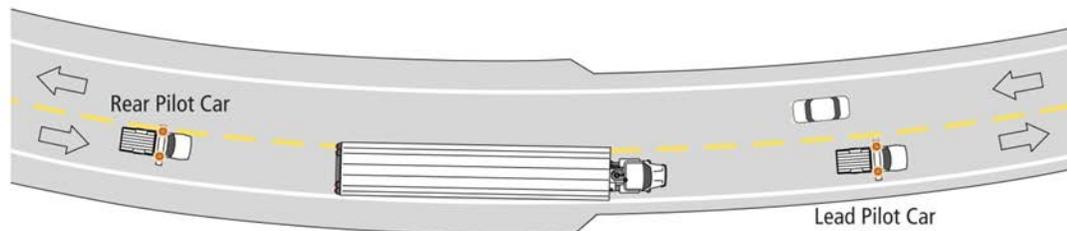
7.1 Two Lane Road Positioning – One or Two Pilot Cars

On two lane highways where only one pilot car is used, it typically occupies the lead pilot car position (except for loads that are overlength and not exceeding 3.2 m wide, when it travels to the rear.) The lead pilot car is watching for hazards that should be communicated to the load driver, including overhead restrictions, and making oncoming traffic aware of the approaching load. Where two pilot cars are required, one is positioned to the front and one to the rear of the load.

For overlength only, or when there is a rear pilot car because two cars were required by the permit, the rear pilot car travels behind the permitted load at a safe distance. The rear pilot car should drive as close to the left side of the lane as practicable without crossing the centreline.

Typically, the oversize load travels as far to the right as possible given the road geometry and obstacles.

Figure 7.1 Two lane road with two pilot cars



7.2 Two and three lane highway positioning – one or two pilot cars

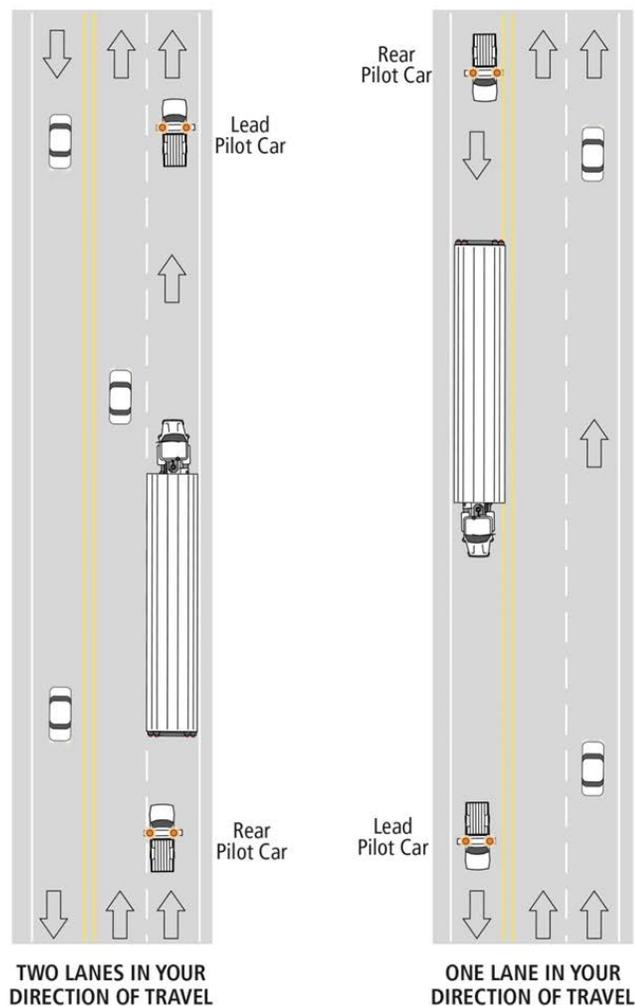
The lead pilot car is watching for hazards that should be communicated to the load driver, including overhead restrictions, and making oncoming traffic aware of the approaching load. The position of the rear pilot car may change depending on whether travelling uphill or downhill, the number of lanes in its direction of travel, and on the position of the oversize load.

With two lanes in your direction of travel, often on an uphill slope, if it is unsafe for vehicles to pass, the rear pilot car positions itself in the lane to the left of the load, blocking traffic approaching from the rear.

With one lane in your direction of travel, often on a downhill slope, the rear pilot car travels behind the permitted load at a safe distance. The rear pilot car should drive as close to the left side of the lane as practicable without crossing the centreline.

Typically, the oversize load travels as far to the right as possible given the road geometry and obstacles.

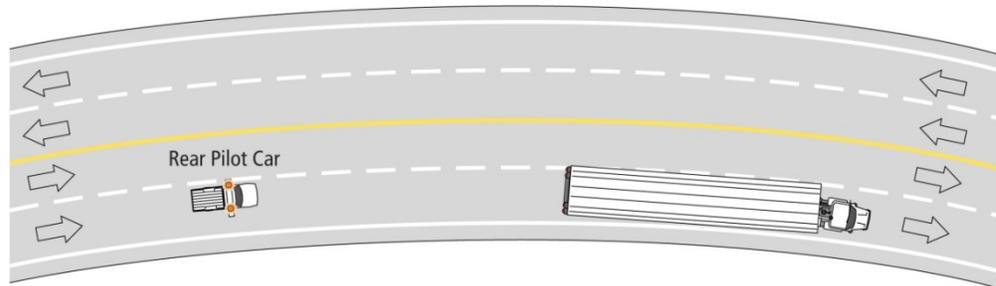
Figure 7.2 Passing or Climbing Lane – Two Pilot Cars



7.3 Multilane Highway – One and Two Pilot Cars

For highways with 4 or more lanes, or on divided highways with one pilot car, the pilot car is positioned in the rear pilot car position to alert drivers approaching the load from the rear. The pilot car typically operates 4 to 8 seconds behind the load.

Figure 7.3A Multilane highway - one pilot car



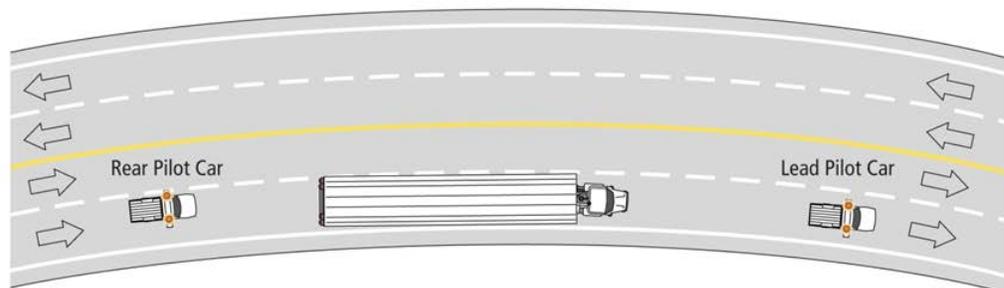
When two pilot cars are required, one pilot car travels to the front and one to the rear, in the same lane as the load.

The lead pilot car is watching for hazards that should be communicated to the load driver, including overhead restrictions, and making oncoming traffic aware of the approaching load.

The rear pilot car should drive as close to the left side of the lane as practicable without crossing the lane line, unless necessary to place the vehicle in line with the left side of the load to protect it from other traffic.

Typically, the oversize load travels as far to the right as possible given the road geometry and obstacles.

Figure 7.3B Multilane highway - two pilot cars



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Section 8: Pilot Car Load Movement Layouts – Structures

8.1 Two-lane bridges with two-way traffic – Two pilot cars

One common reason to close a bridge for a load to pass is the width of the load. Another is that weight permits often set out specific conditions for bridge crossings, which may necessitate closure of the bridge. In some cases, you may be able to allow traffic to the rear to follow the load across the bridge. Sometimes, though, the permit conditions will require that traffic be stopped in both directions while the load proceeds.

The diagrams in this section show two pilot cars. See [8.2 Two Lane bridge with two-way traffic – Three Pilot Cars](#) if your permit requires three pilot cars.

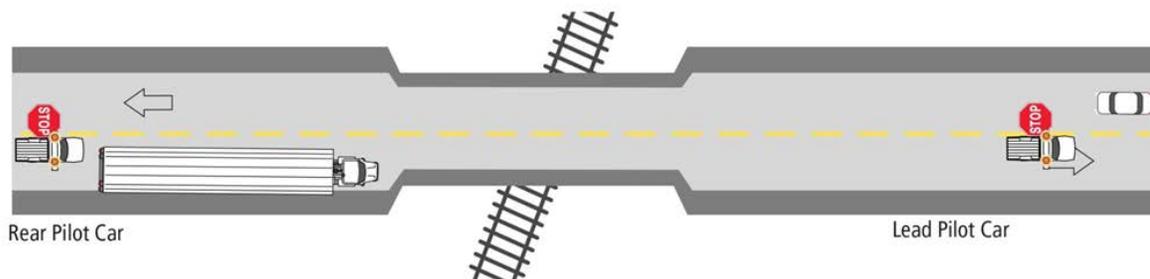
See [Section 5](#) for guidance about stopping distances and whether to flag from inside or outside the vehicle.

In this scenario, the lead pilot car may need to move well out in front of the load as the team approaches a bridge stop location, to the first location past the bridge that has appropriate sight lines for the oncoming traffic, and sufficient room between the lead pilot car and the bridge so that the load will be able to clear the bridge completely before the oncoming traffic is released. The lead pilot car will rely on communication with the load driver to know when the load is approaching the bridge. If it is necessary for the lead pilot car to wait before commencing the traffic stop, it should do so on the shoulder.

Once the lead pilot car has traffic stopped, it radios the rest of the team (with a description of the last car on its way to the load, if applicable), and the load proceeds across the bridge, with the rear car either trailing or holding traffic (if permit conditions require that no other traffic should be on the bridge with the load.)

As soon as the load clears the bridge, the rear pilot car radios that the lead pilot car can release traffic. The lead pilot car waits for the load and the rear pilot car to reach its location and the team proceeds.

Figure 8.1 Two lane bridge with two-way traffic – Load approaching the bridge, waiting for the lead pilot car to advise that traffic is stopped before proceeding



8.2 Two-lane bridges with two-way traffic – Three pilot cars

If your permit requires three pilot cars, you will normally have two in front (scout and lead) and one to the rear.

The scout pilot car will normally be moving well ahead of the rest of the vehicles in the move team, in order to stop traffic where sight lines are good, as needed for the load to proceed. This is no different in a two-lane bridge crossing with two-way traffic; oncoming traffic should be stopped at the first location past the bridge that has appropriate sight lines for the oncoming traffic, and sufficient room between the scout pilot car and the bridge so that the load will be able to clear the bridge completely before the oncoming traffic is released. The scout pilot car will rely on communication with the lead pilot car to know when the load is approaching the bridge. If it is necessary for the scout pilot car to wait before commencing the traffic stop, it should do so on the shoulder.

In this scenario, the lead pilot car is just ahead of the load as it travels to the bridge and, once the scout pilot car radios that traffic is stopped (with a description of the last car on its way to the load, if applicable), the lead pilot car waits for the last oncoming car and then proceeds to the scout pilot car's position and takes over there. The scout pilot car can then proceed to its next stop location. Some pilot car teams prefer to use a 'leap-frog' approach where the scout and lead pilot cars trade positions at each stop rather than have the lead pilot car take over from the scout car at each stop location.

Meanwhile, the load proceeds across the bridge, with the rear car either trailing or holding traffic (if permit conditions require that no other traffic should be on the bridge with the load.)

As soon as the load clears the bridge, the rear pilot car radios that the lead pilot car can release traffic. The lead pilot car waits for the load and the rear pilot car to reach its location and radios the scout pilot car that all vehicles are once more on the move.

Note: When the scout or lead pilot car is holding oncoming traffic, if more than a few vehicles are queued, the pilot car operator may choose to ask the first stopped car to wait until the oversize load reaches them and then proceed. Once they have agreement from that first stopped driver, they can slowly travel down the line of cars, with their stop sign out, partly to inform the waiting drivers of the reason for the delay (if time allows), but importantly, to protect the last stopped vehicle by keeping the pilot car lights and stop sign at the point where new arriving vehicles must stop.

Figure 8.2A Two lane bridge with two-way traffic – Three Pilot Cars

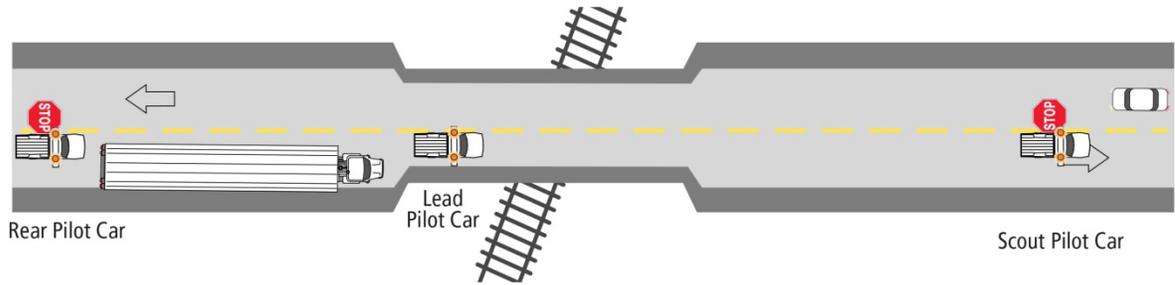
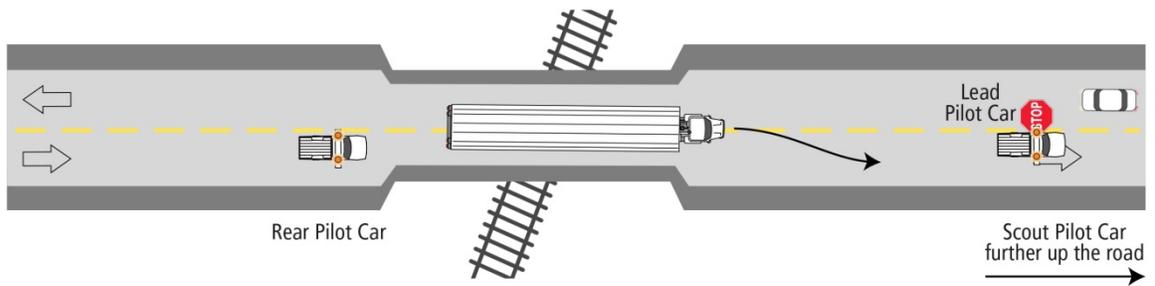


Figure 8.2B Two lane bridge with two-way traffic – Three Pilot Cars



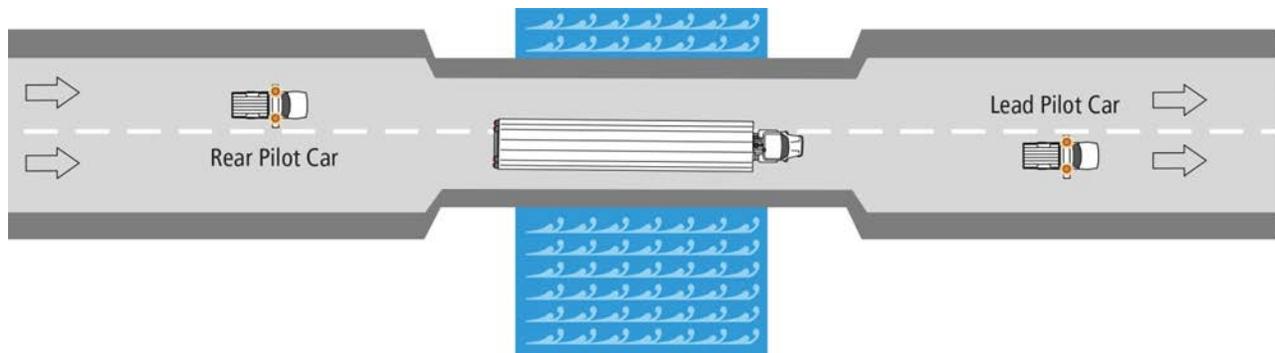
8.3 Multilane-bridges with one way traffic

If two pilot cars are required for the move, the lead pilot car should notify the load driver as far in advance as possible of any approaching obstructions.

If the load must cross straddling two lanes (or down the centre of the bridge), but there is no permit requirement that other traffic must be kept off the bridge during the crossing, the rear pilot car will move left just before the load moves left, blocking other vehicles from passing and informing the load driver when they are in position. As soon as the load and rear pilot car have crossed the bridge, the rear pilot car driver moves right into their normal travelling position and notifies the load driver by radio that it is safe to move right.

If permit conditions require that no other vehicles may be on the bridge with the load, the lead pilot car should join the rear pilot car behind the load in advance of the bridge, and together, they hold traffic while the load moves across. Depending on the terrain and the length of the bridge, it may be possible to perform this manoeuvre at rolling speed, but a full stop may be required.

Figure 8.3 Multilane bridges with one-way traffic



8.4 Tunnels and other restricted sight distance locations

Controlling traffic for the movement of oversized loads where sight distance restrictions exist is a challenging situation for pilot cars. The reason is the lack of advance knowledge for approaching motorists of where the oversize load is situated. At locations with restricted sight distance (tunnels or other blind corners), traffic control may be required, especially if the load may encroach into an oncoming lane.

Safety Planning: In situations where the route follows a winding road, a scout pilot car is beneficial. The scout pilot car can travel further ahead and provide advance notification to the load and other pilot cars of constraints as well as establish traffic control. If a scout pilot car is used, it can assume the traffic control and some of the communication duties of the lead pilot car as described below. For traffic control (flagging) information see Section 7.

If no scout pilot car is used, the lead pilot car should travel well ahead of the load, and communicate with the oversize load driver about constraints and any approaching traffic.

At any locations where the load will encroach into an oncoming lane and traffic control is required, the scout or lead pilot car will choose a location with good lines of sight for approaching traffic.

See [Section 5](#) for guidance about stopping distances and whether to flag from inside or outside the vehicle.

The lead pilot car will rely on communication with the load driver to know when the load is approaching the constrained area. If it is necessary for the lead pilot car to wait before commencing the traffic stop, it should do so on the shoulder.

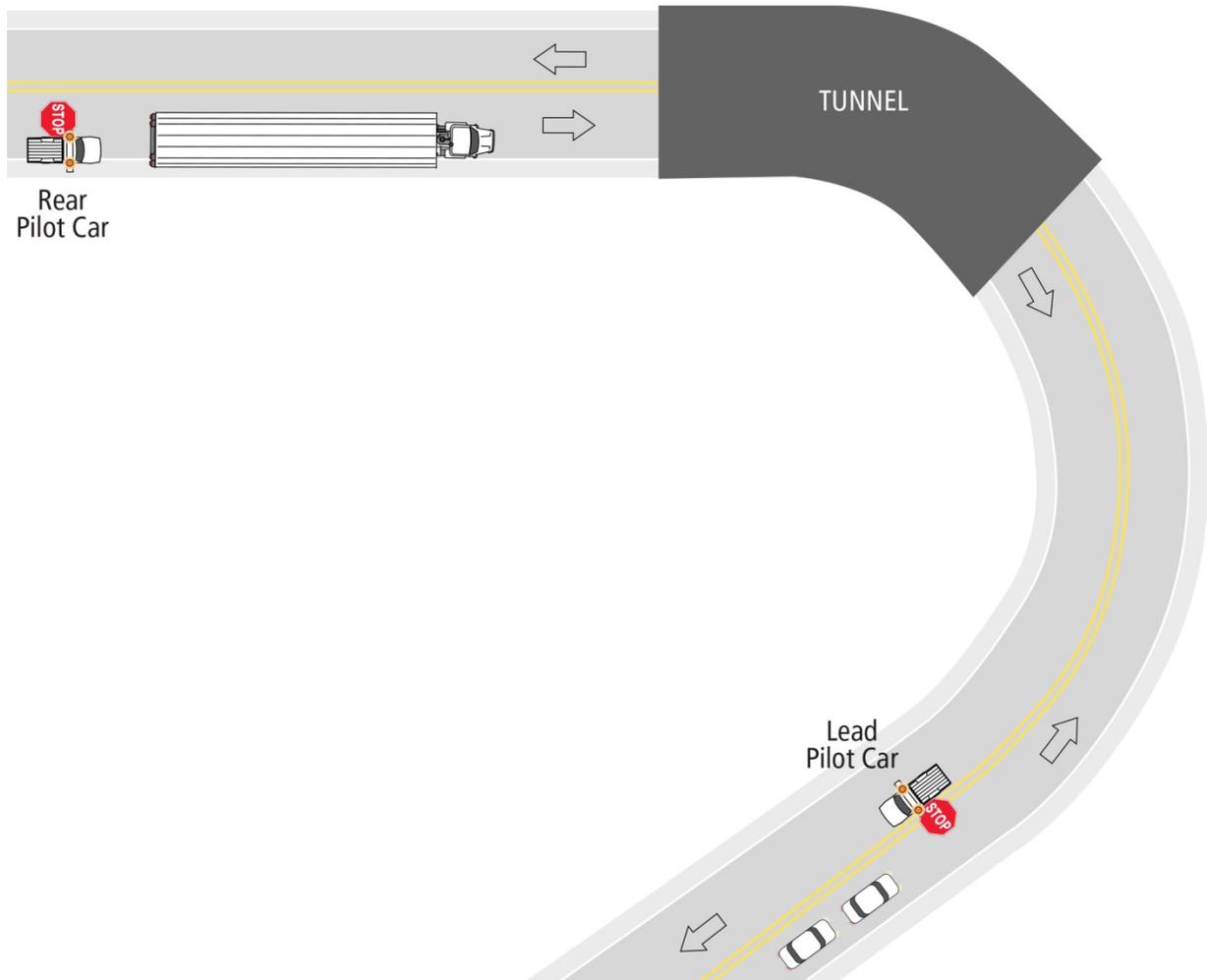
Once the lead pilot car has traffic stopped, it radios the rest of the team (with a description of the last car on its way to the load, if applicable), and the load proceeds through the constrained area, with the rear pilot car either trailing, or holding traffic to the rear, if necessary.

As soon as the load clears the tunnel or other restricted sight location, the rear pilot car radios that the lead pilot car can release traffic. The lead pilot car waits for the load and the rear pilot car to reach its location and the team proceeds.

On very curvy stretches of highway, it may be necessary to divide the highway into sections and perform traffic control for each section separately, moving the load from one safe stopping location to the next. In this case, a scout pilot car would be recommended, particularly if there are other access points to the highway between the scout pilot car and the load. The rear pilot car stops with the load, in line with the left edge of the load, and assists the load to re-enter the highway from each stopping location.

Where curves, or terrain features make radio communication challenging or impossible, the lead or scout pilot car stopping traffic may use the 'baton method', giving a baton or flag to the last car proceeding towards the load and asking the driver to pass that baton or flag to the rear pilot car.

Figure 8.4 Tunnels and other sight distance restricted locations



8.5 Railway Crossings

Overlength loads must also be evaluated for railway crossings to make sure that long loads do not:

- become 'high centered', as shown in Figure 8.5
- encounter problems resulting from the time it may take for a long load to clear a rail crossing, particularly near intersections or other road geometry features

Railway crossings should be assessed for:

- Amount of daily rail traffic to be encountered
- Crossing profiles between highway and rails
- Slope on the approaches and departures, the length of crossing, the number of tracks, and the road condition over the tracks both on approach and departure including curves and the need to make turns.
- In cases where railway crossings are a concern for the move, ensure that emergency contact numbers for the railways are available
- Advance contact should be made with the railroad if there is any doubt the load can safely negotiate the crossing

Figure 8.5 Railway crossing clearances



The profiles of railway crossings encountered along a route can vary, making them a potential location for a load to get hung up, or 'high centred'. Always assess all railway crossings along a route for clearances, especially if "lowboy" trailers are involved in the move.

If you think the rails may have been damaged by a move, you should contact the railway immediately so that they can ensure safe rail operations are maintained.

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Section 9: Pilot Car Load Movement Layouts – Intersections

9.1 Driving in urban conditions

In British Columbia, primary highways often travel through the heart of municipalities and smaller communities. Movement through urban areas requires additional care and constant communication within the move team. Some additional issues to be considered include:

- An increase in the number and density of height clearance restrictions, such as low wires and signs;
- Pedestrians and cyclists, which may be difficult for the load driver to see;
- An increase in activity, including the number of other drivers, private accesses, unexpected obstacles;
- Raised channelization (eg. pedestrian islands) and landscape treatments;
- Increased traffic volumes building up behind the load, which may need traffic control management.
- Limited sightlines due to buildings and other structures.

Some urban obstacles may require that the load move temporarily into lanes meant for opposing traffic, or in some other manner that requires traffic control. Appropriate approvals must be in place.

The number of pilot cars required by a permit depends on the load characteristics, however, for loads in excess of 4.88 m high, the use of three pilot cars (scout, lead, and rear) is recommended.

Relatively smaller wide or long load moves may be conducted with one pilot car, but at least two are recommended in areas with tighter turns, higher traffic volumes or obstructions that require the load to travel in opposing lane(s).

Figure 9.1A Driving in urban conditions – Traffic entering intersection is stopped

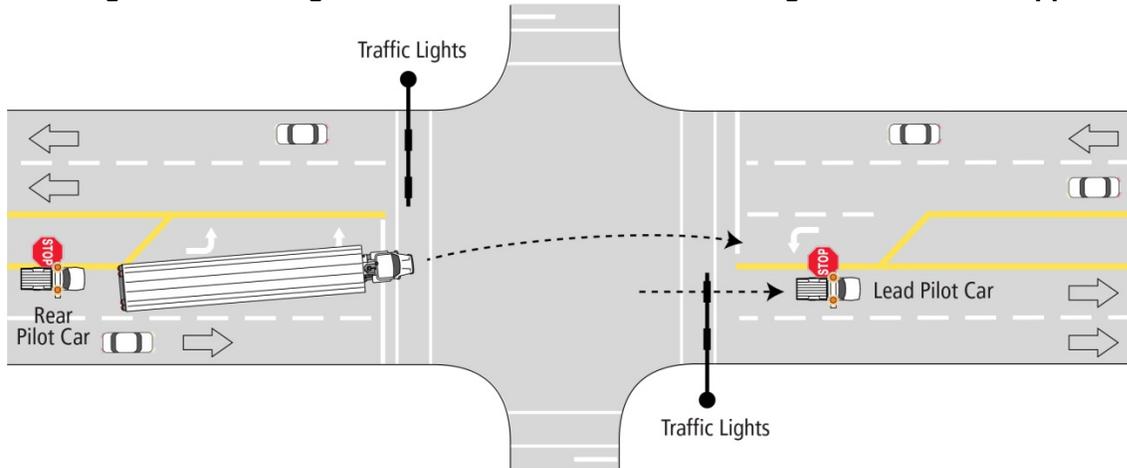


Figure 9.1B Driving in urban conditions – Load uses opposing lane to cross intersection

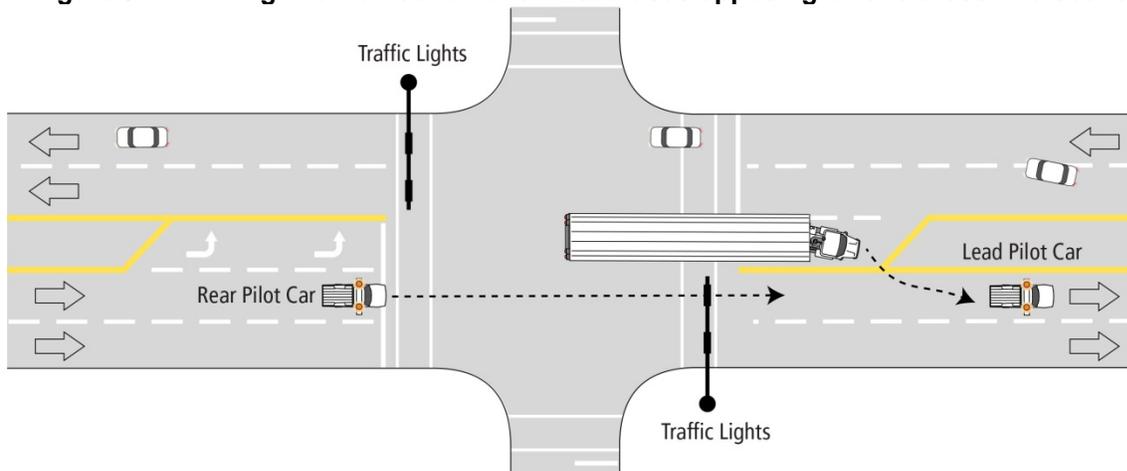


Figure 9.1C Driving in urban conditions – Load returns to travel lane

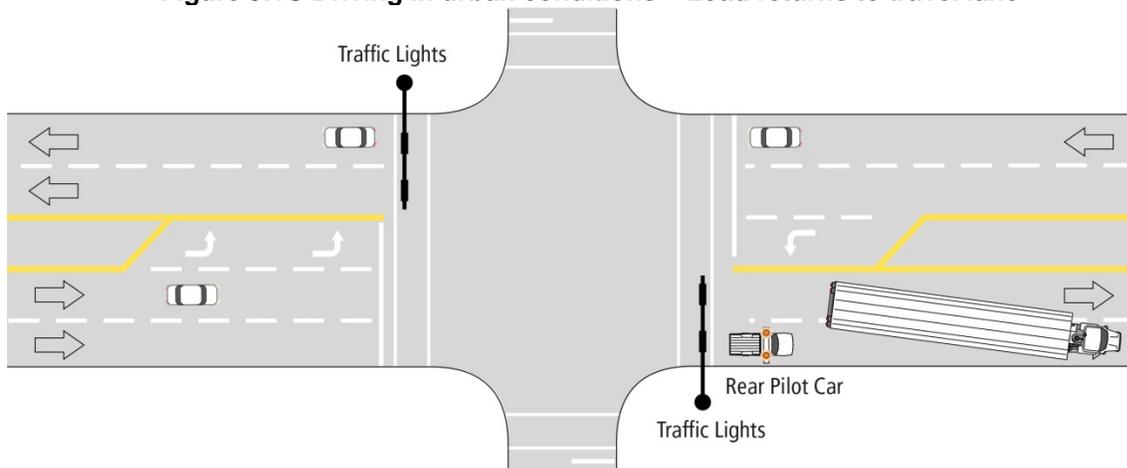
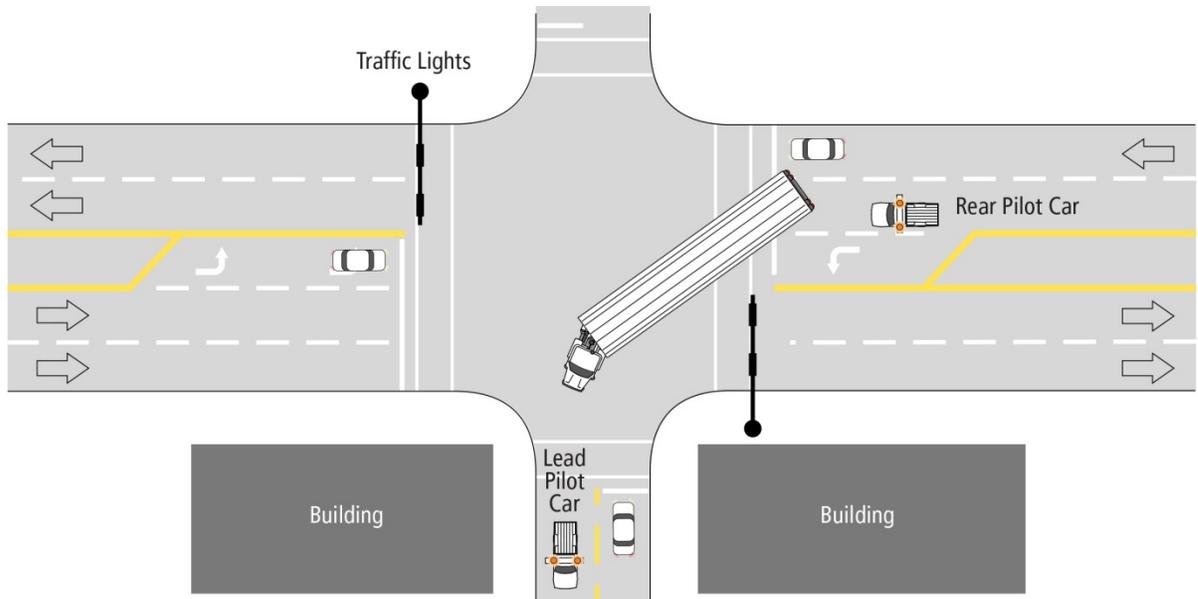


Figure 9.1D Driving in urban conditions – limited visibility at an intersection



9.2 Obeying traffic signals

Traffic signals must be obeyed when travelling a route controlled by traffic signals. Stopping for signals may cause the pilot cars and load to become separated for short durations. Pilot cars and the load driver should remain in communication and reduce speed or wait for each other, as necessary, in order to resume normal operation.

If the pilot car passes through the intersection, but the load is required to stop, the lead pilot car should pull over as soon as possible and resume travel as the load approaches.

When the rear pilot car is stopped by a red light which has been cleared by the load, the load driver (and lead pilot car) should proceed at a reduced speed until the rear pilot car has caught up.

The pilot car driver(s) must be alert and avoid sudden stops at traffic signals.

9.3 Right turns and load tail swing

Sometimes, when a large load moves to the left at the beginning of a right turn, other vehicles try to take the inside lane, not realizing the load's intent. Furthermore, oversized loads with a larger rear overhang have a tail swing that may be faster as it swings than the forward movement of the load, and may project into oncoming lanes towards the end of the turn. In congested areas, that swing may need traffic control to protect surrounding traffic and roadside infrastructure such as trees and signs. Pilot cars need to anticipate that they may need to protect both the oversized load and the other traffic, and adjust their positions accordingly.

If only one pilot car is used, its positioning in advance of an intersection depends on the load characteristics. Typically the pilot car will be ahead of the load unless the load is long and not very wide, in which case the pilot car will likely be in a rear pilot car position. A two pilot car scenario is shown in the diagrams below.

For a right turn, the rear pilot car starts in the right-most lane, while the load swings wide and begins the turn, to keep other traffic from moving in too close to the corner. Once the oversized load is into the turn to the right, the rear pilot car moves left, to the outer rear corner of the load, to follow the tail-swing through the turn, bringing attention to any encroachment into oncoming traffic lanes.

Figure 9.3A Right turns and load tail swing

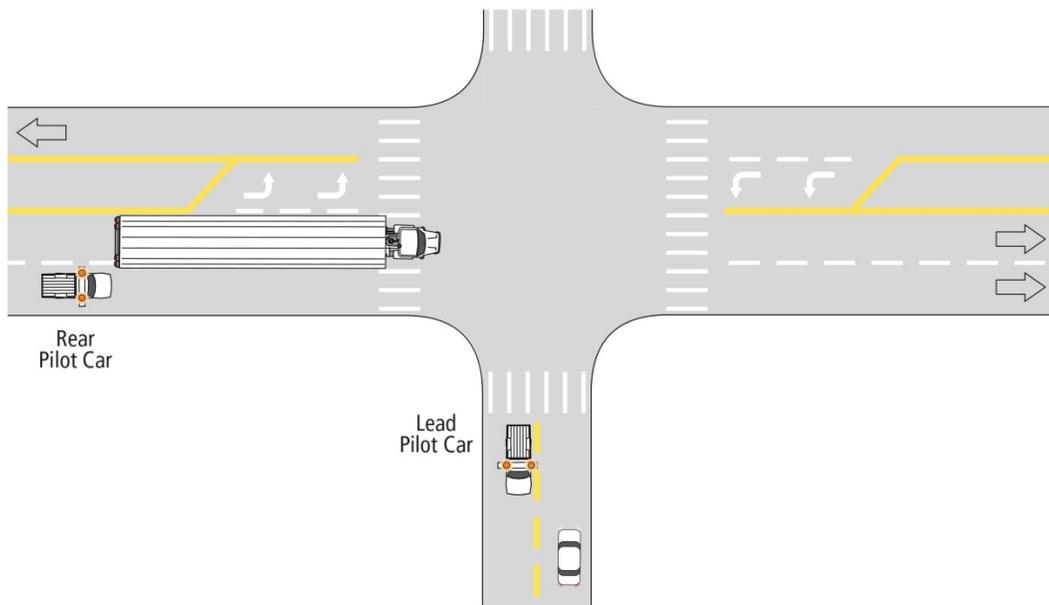


Figure 9.3B Right turns and load tail swing

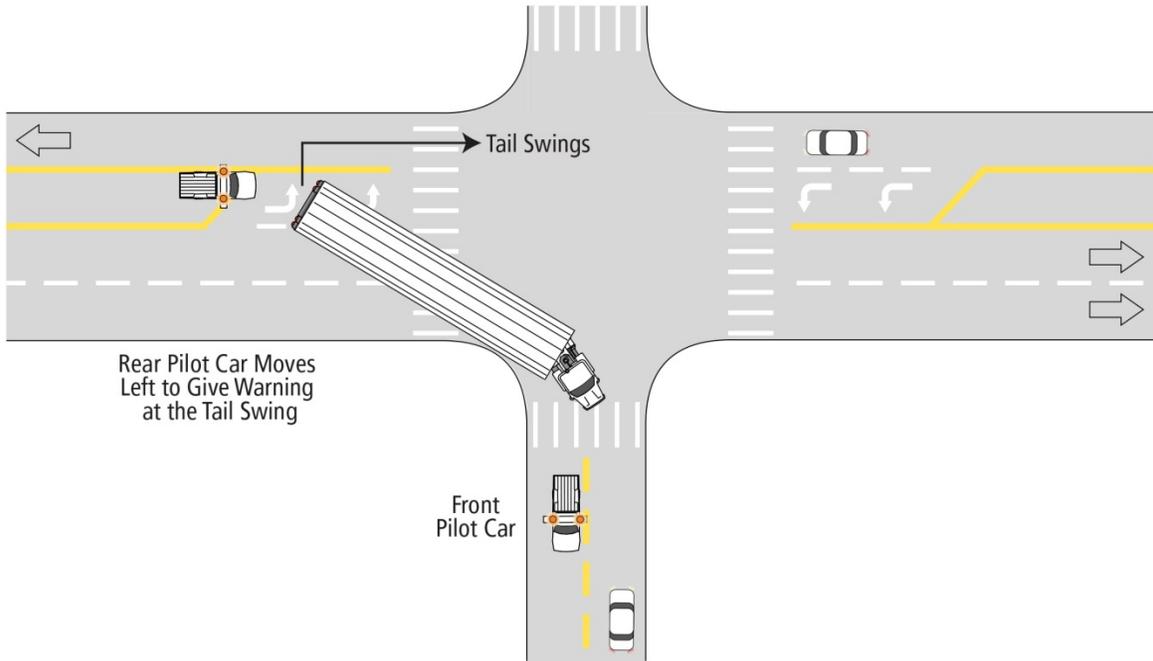
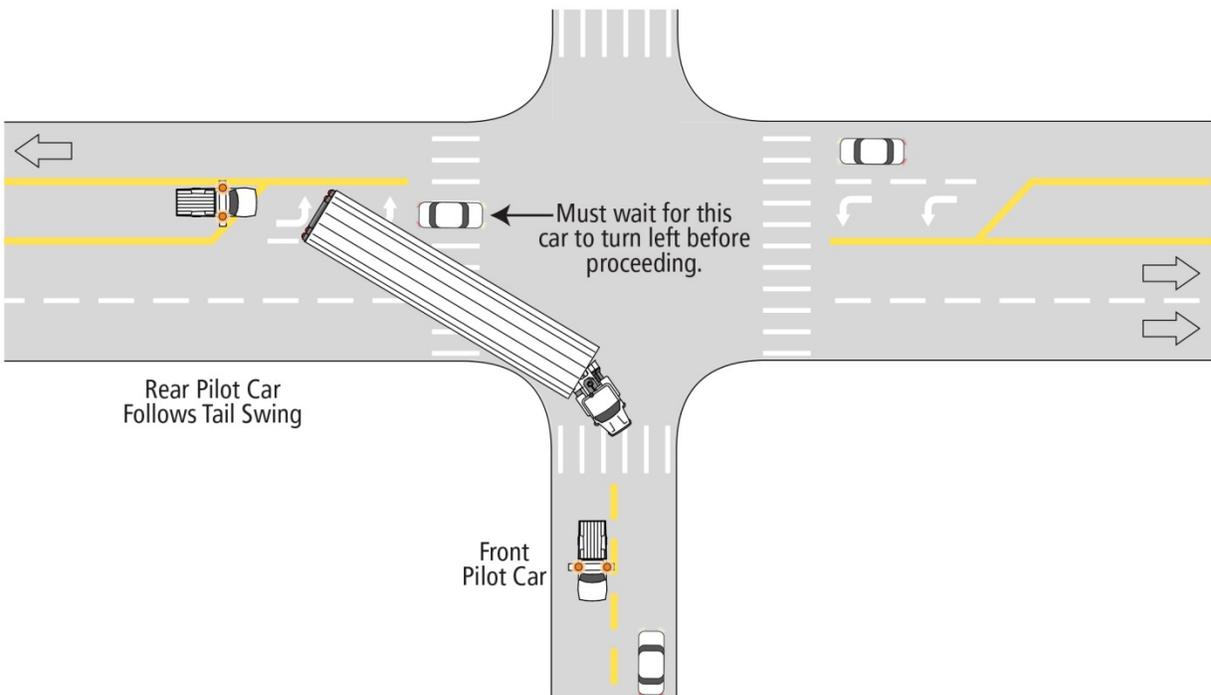


Figure 9.3C Right turns and load tail swing



9.4 Left Turns

See the previous section, 'Right turns and load tail swing', for additional information about manoeuvring the load at intersections.

Figure 9.4A Left turns

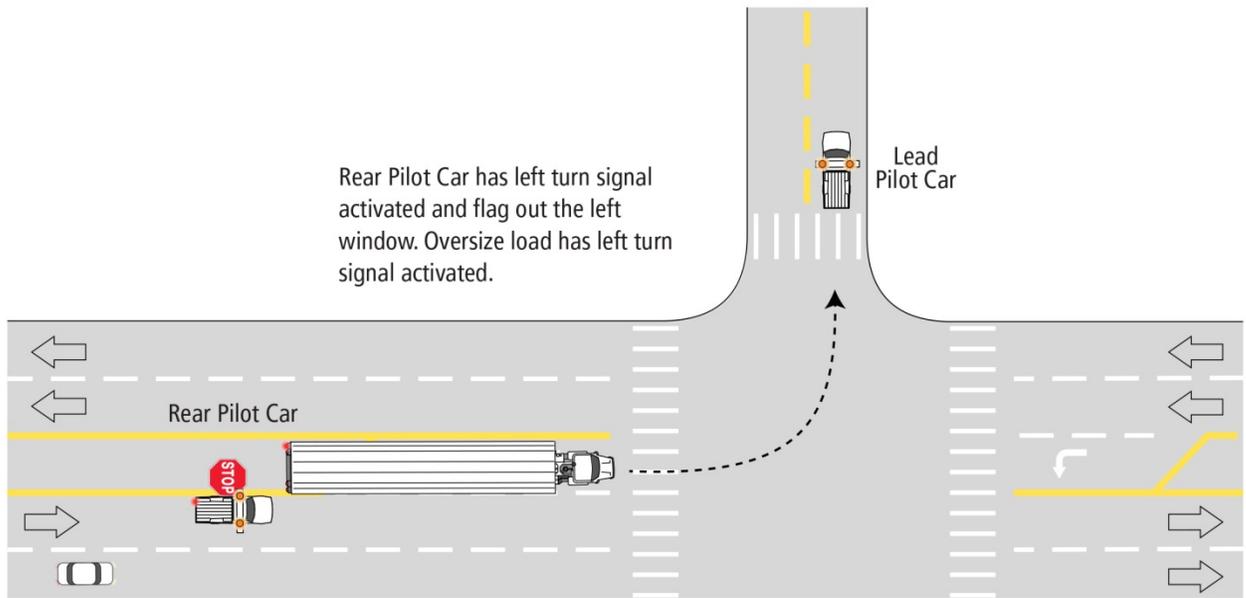


Figure 9.4B Left turns

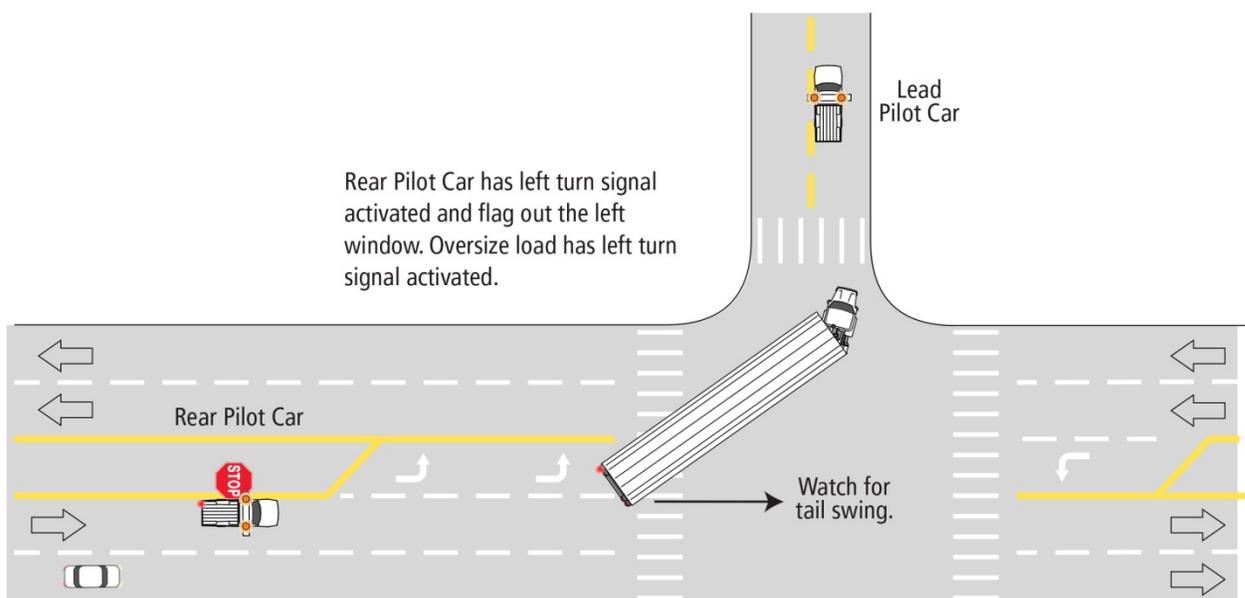
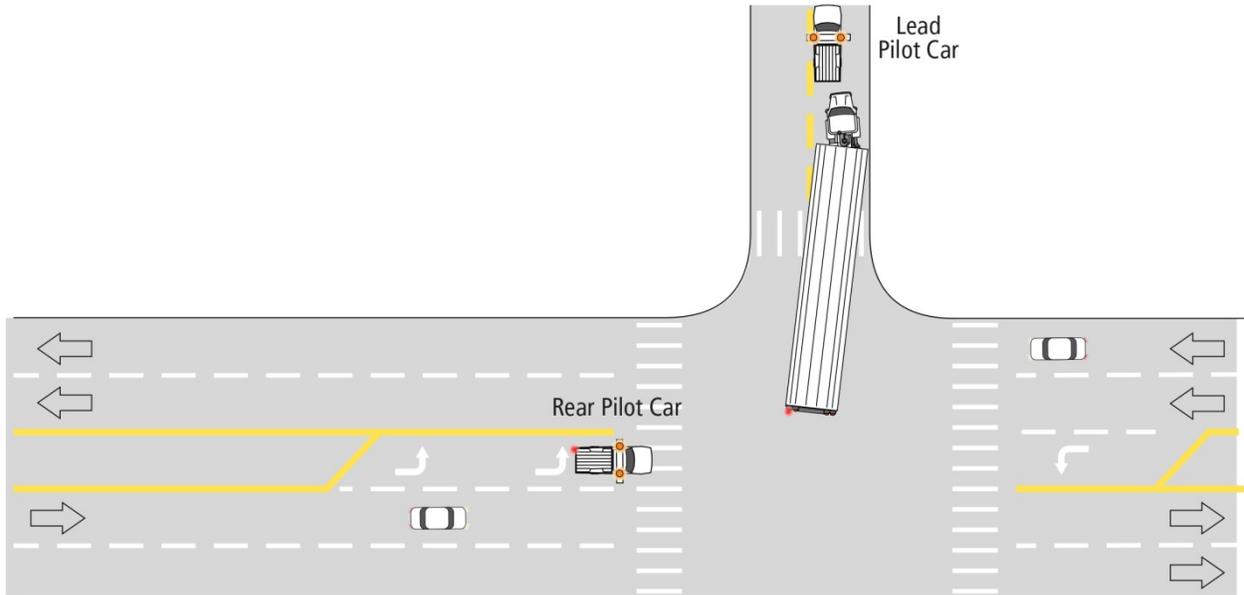


Figure 9.4C Left turns



9.5 Roundabouts

The Ministry has designed roundabouts located on numbered highways to accommodate the same design vehicles as used to design the intersections used on BC highways. When oversize loads are required to traverse through roundabouts, these oversize loads may be required to straddle both lanes of the roundabout and make use of the truck apron, if needed.

If the carrier that will be moving the oversize load on this route has concerns that the load may have difficulty maneuvering through the roundabout, they can provide a schematic of the loaded vehicle configuration to BC MoT's Commercial Vehicle Safety and Enforcement Branch (CVSE) at commercial.transport@gov.bc.ca, with a request to check the vehicle's configuration with that of the roundabout's design, to be sure the oversize load will fit. In the unlikely occurrence the oversize load will not be able to maneuver the roundabout, another route will have to be identified.

All BC MoT roundabouts are designed with a truck apron, which is a raised section of pavement around the central island that acts as extra space where a large vehicle trailer can "track." The back wheels of the oversize load's trailer can ride up on the truck apron so the truck can easily complete the turn. This section of the roundabout is specifically for the use of truck trailers and is raised as a means to discourage its use by smaller vehicles.

In British Columbia, most numbered highway roundabouts will have a minimum two lanes (per direction) on the highway legs of the roundabout. Therefore, at these multilane roundabouts, oversize load drivers may occupy the entire circular roadway to travel through the roundabouts. Oversize load drivers should straddle both lanes prior to entering the roundabout, to clearly identify the oversize load will need all lanes to traverse the roundabout. A single lane roundabout is shown in the diagrams below.

Figure 9.5A Operating through roundabouts



Figure 9.5B Operating through roundabouts – making use of the truck apron

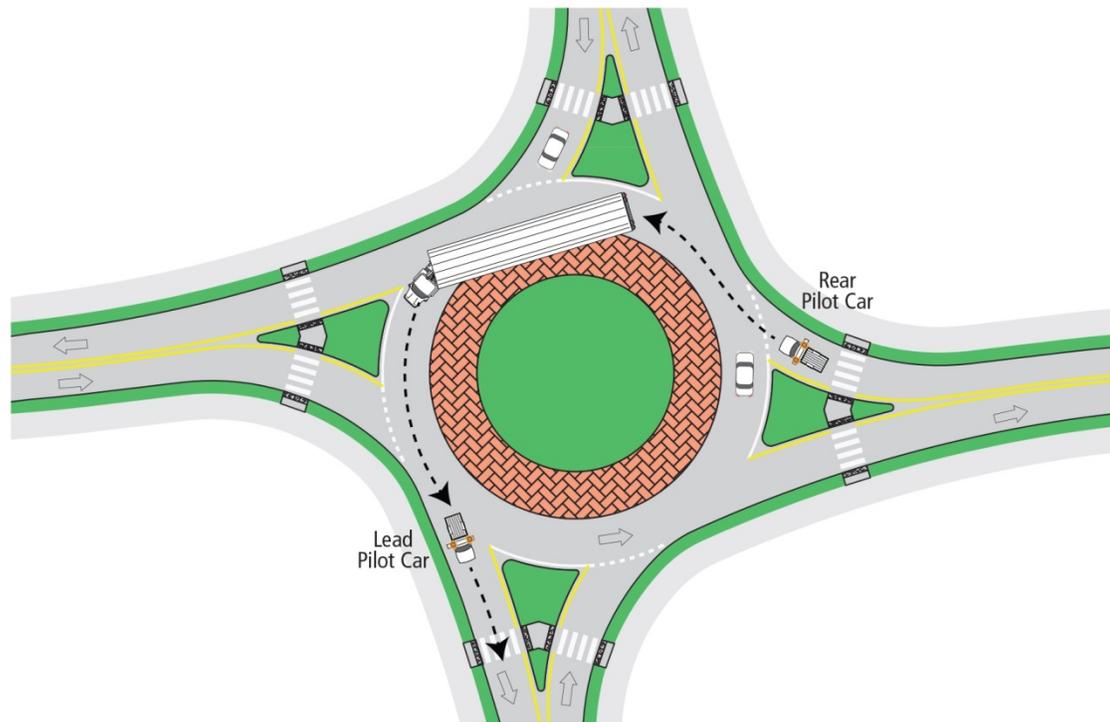
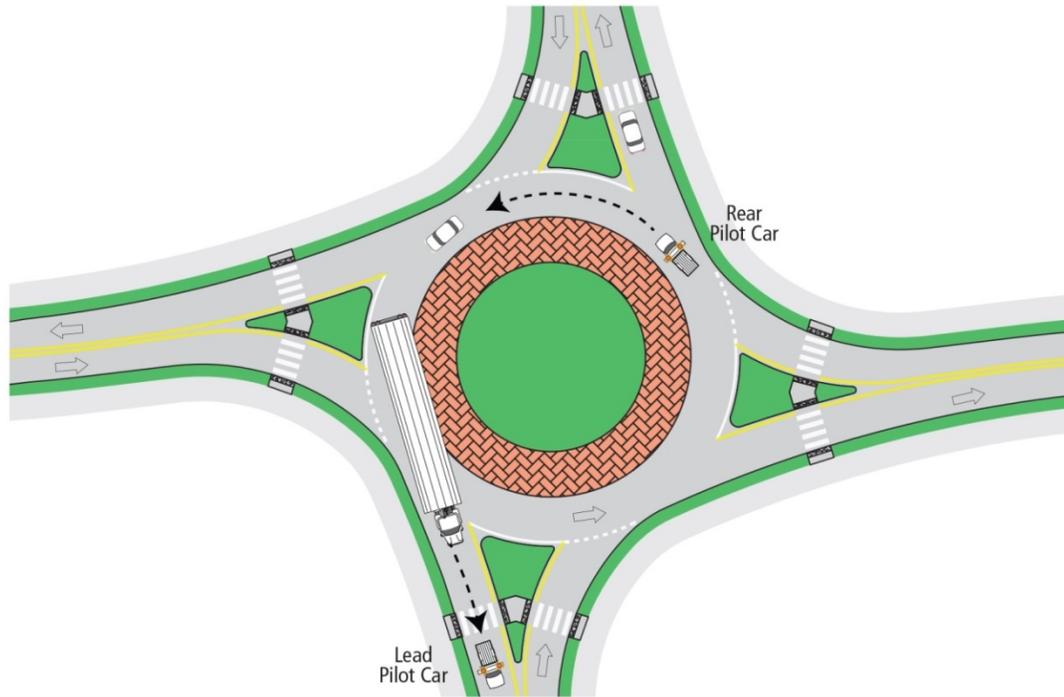


Figure 9.5C Operating through roundabouts



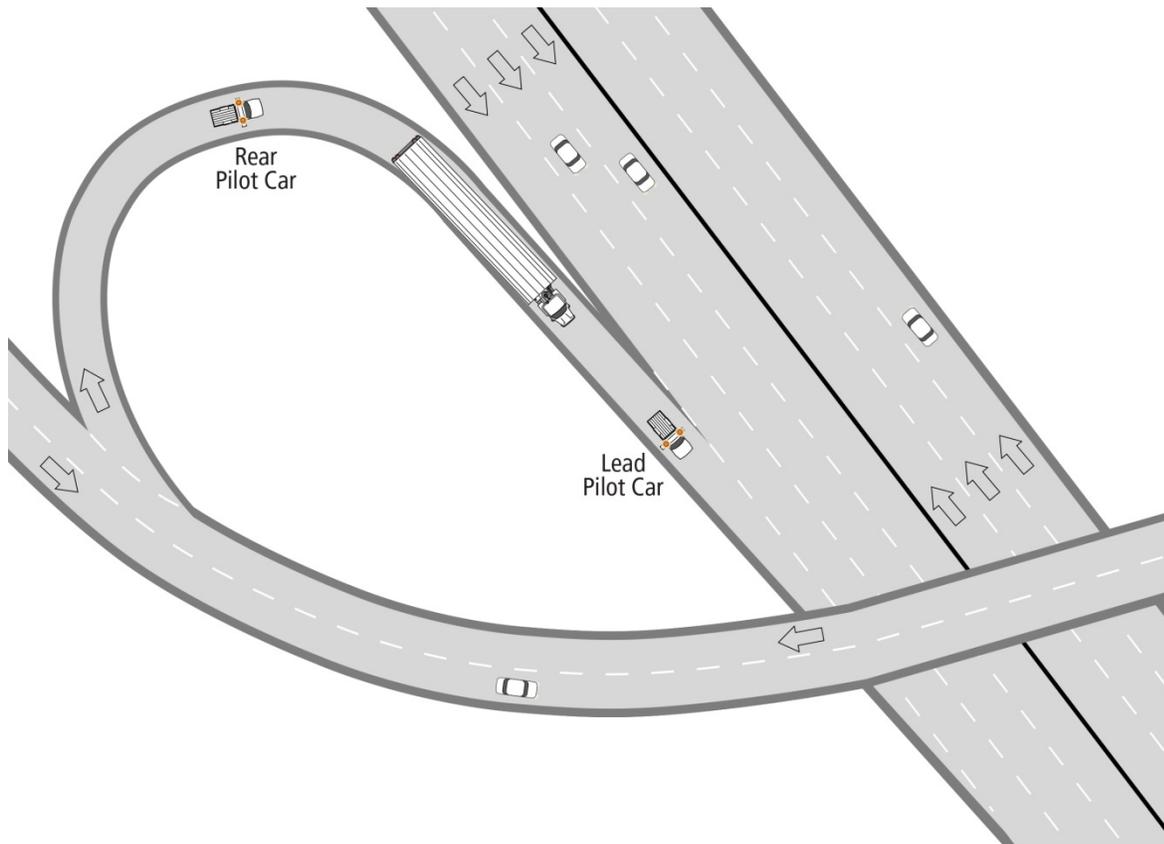
9.6 Interchanges

When approaching an interchange, it is important the move team is familiar enough with the interchange to decide where to position the pilot car(s). In most cases, the pilot car(s) will protect the rear of the load as it moves into the highway it is joining. In some cases, though, it may be useful to have a single pilot car out front to give advance warning of the approach of the load. Good communication within the move team is essential here.

Quite often, cloverleaves are constructed with compound curves due to space limitations, meaning that the tightness and elevation of the curve varies as you move through it. In a large cloverleaf, it is also common to find a zone where one stream of traffic is merging in while another is merging out. For large loads, this means that extra caution about speed and the interaction with other vehicles must be taken.

A two pilot car scenario is shown in the diagram below.

Figure 9.6 Cloverleaf style interchange



Section 10: Pilot Car Load Movement Layouts – Constriction Points

10.1 Overhead Obstacles

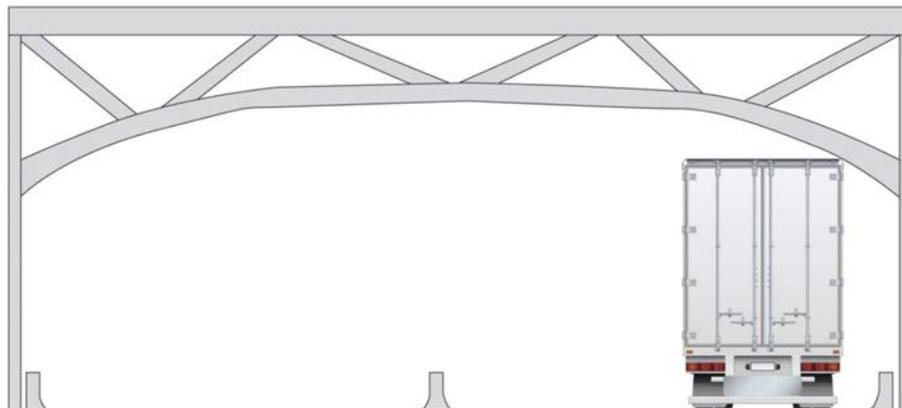
Clearances can vary from one lane to another under a structure. Use caution when approaching an overpass or other type of structure over the roadway, and communicate clearly with the oversize load driver, to ensure that the load you are escorting is in the correct lane.

For loads with heights close to the bridge and other infrastructure clearance restrictions found along the route, checking clearance heights with a laser measure or other device should be considered. When measuring, remember not to make contact with overhead lines. Make any physical measurements to lines to the side of the line so that the measuring stick does not make contact. Checking clearance heights is particularly important at bridges, overpass structures, or power lines that have a variable clearance depending on the lane selected and direction of travel. Other highway infrastructure that may need to be checked along the route for clearances, both vertical and lateral are: signs, luminaire poles, power poles, wires and any device added as part of highway maintenance and construction.

Utility lines can be especially hazardous as many of the lines that cross highway systems are high voltage systems. The handling of telephone, television, or power lines must be left to the professionals from the utility organizations. For the protection of all users of the highway system including those involved with the move, use these precautions:

- Notify utility companies when working near lines when clearances are not known or where clearances need to be adjusted to get the load through
- Treat all wires and electrical equipment that are encountered with the move to be energized. Always check with the utility involved about the status of the system (de-energized or not, etc.)

Figure 10.1 Bridge clearances – Note that available height clearance may vary



10.2 Obstacles on the shoulder

Sometimes shoulder space is limited by manmade structures such as supports for railway overpasses, bridge railings, and signs. It is also common in British Columbia to encounter natural constriction points such as rock outcroppings or other kinds of steep grades. Room on the shoulder may be limited, and when a vehicle, pedestrian, cyclist or other obstruction is on the shoulder, an oversize load may need to move left to avoid the obstacle.

One very important role of a lead or scout pilot car is to communicate about upcoming obstacles to the load driver, so that he or she can adjust speed and positioning as necessary, to get around it. Be as clear and descriptive about the situation to be encountered as possible.

In some cases, it may be necessary to stop the load and do traffic control to make room for the load to move through.

Figure 10.2A Obstacles on the shoulder

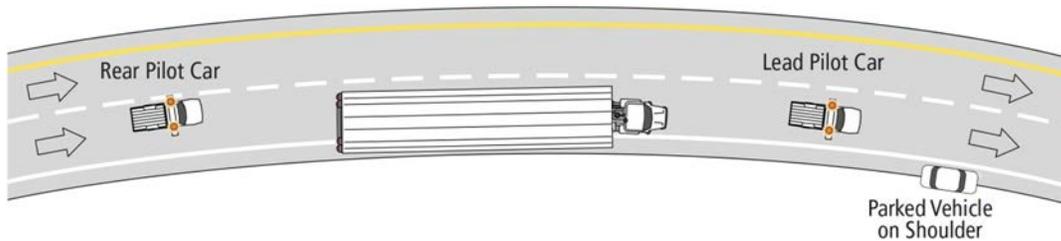


Figure 10.2B Obstacles on the shoulder

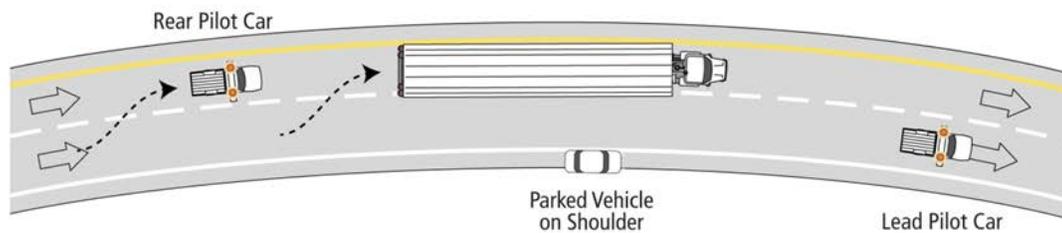
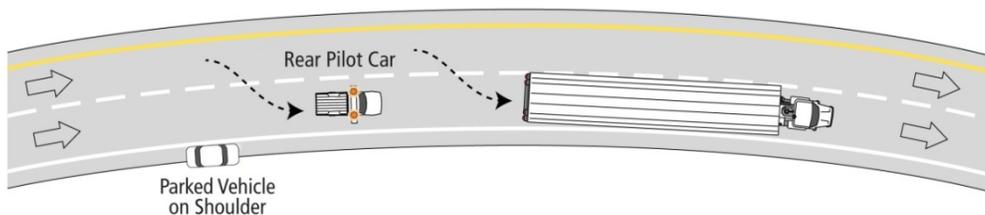


Figure 10.2C Obstacles on the shoulder



10.3 Weigh Scales and Border Crossings

If an open scale or border crossing is encountered during a load move, Pilot Cars should accompany the vehicle they are escorting through the scale or border crossing, and re-enter the highway together, in appropriate positioning.

Figure 10.3A Re-entry from weigh scale

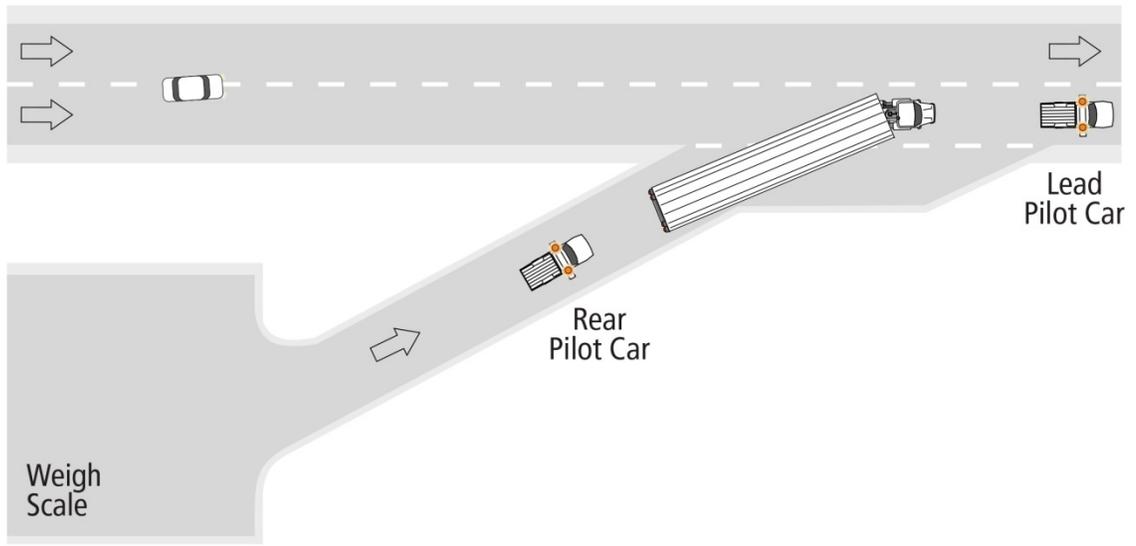
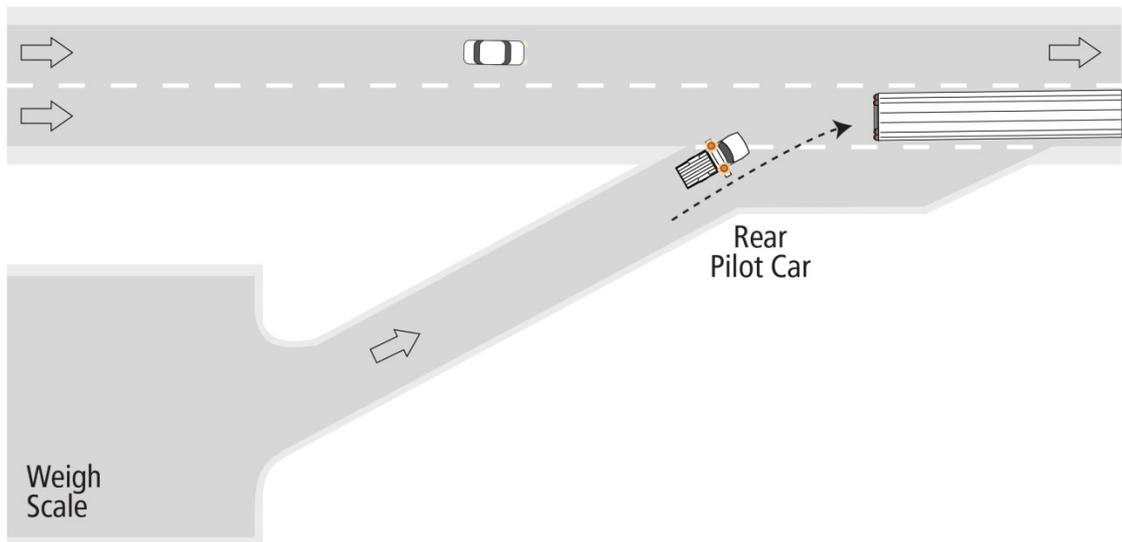


Figure 10.3B Re-entry from weigh scale



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Section 11: Resources

There are many useful links and resources in these guidelines.

11.1 Regulations

- BC Commercial Transport Regulations, Division 7
http://www.bclaws.ca/civix/document/id/complete/statreg/30_78#division_d2e1638
- BC Commercial Transport Regulations, Division 8.
http://www.bclaws.ca/civix/document/id/complete/statreg/30_78#division_d2e4480
- WorkSafeBC Occupational Health and Safety Regulation Guidelines Part 18, Section 9a
<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-18>
- Part 19 of the Occupational Health and Safety Regulation
<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-19>

11.2 Forms

- T-Forms (All)
<http://www.cvse.ca/whatsnew.html>
- Extraordinary Load Approval Request Form
<http://www.th.gov.bc.ca/forms/getForm.aspx?formId=1262>
- CVSE 1000
<http://www.th.gov.bc.ca/forms/getForm.aspx?formId=1251>
- CVSE1011
<http://www.th.gov.bc.ca/forms/getForm.aspx?formId=1258>
- CVSE1052
<http://www.th.gov.bc.ca/forms/getForm.aspx?formId=1265>

11.3 Manuals and Guidelines

- Commercial Transport Procedures Manual
<https://www2.gov.bc.ca/gov/content/transportation/vehicle-safety-enforcement/information-education/commercial-transport-procedures>
- 2015 Interim Traffic Management Manual for Work on Roadways
<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/traffic-engineering-safety/trafficmanagementmanual/2015trafficmanagementmanual>
- Escort Drivers' Handbook (Rev Nov 29, 2011) Alberta Transportation
<http://www.transportation.alberta.ca/Content/docType276/Production/teg054.pdf>
- Pilot Car Escort Best Practices Guidelines, SCRA, FHWA, CVSA
http://ops.fhwa.dot.gov/freight/documents/pilotcar_bpguideline/pilot_car.pdf
- Operation Lifesaver Tips for Professional Drivers
<http://operationlifesaver.ca/resources/professional-drivers/>

- ISED-ISDE2366: Mobile Radio Station Licence Application
<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf06052.html>
- Best management practices for mobile 2-way radio use on resource roads in BC, installation and maintenance. BC Ministry of Forest, Lands, and Natural Resource Operations
https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/resource-roads/bmps_for_radio_use_installation_maintenance_final.pdf
- Important Information on Resource Industry Radio Channels used in British Columbia
<https://www2.gov.bc.ca/gov/content/industry/natural-resource-use/resource-roads/radio-communications>

11.4 Websites

- BC Construction Safety Alliance
<https://www.bccsa.ca/Standardized-Traffic-Control-Training.html>
- Drive BC
<https://www.drivebc.ca/>
- Evergreen Safety Council
www.esc.org
- CV Height Clearance Tool
www.drivebc.ca/cvrp/

11.5 Contacts

- Commercial Vehicle Safety and Enforcement Branch (CVSE) at
commercial.transport@gov.bc.ca
- Provincial Permit Centre at
onRouteBC.gov.bc.ca or 1-800-559-9688

This is the final page.